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Factory Heating From Fuel-Saving Angle

The Use of Hot Water or Steam and the Type of Heating Apparatus in Relation to the Power Proposition

BY WILLIAM J. BALDWIN AND RALPH C. TAGGART.*

When the heating problem becomes associated with other problems in factory operation, namely, the power plant or such operations as drying, steaming, cooking, refrigeration, humidifying, ventilation, etc., there are hundreds of detail questions to be considered. One can, of course, leave these to the contractor or decide a few and leave the rest to him. Such a method is often unsatisfactory unless a higher price is paid for the work and only a contractor of the highest standing is allowed to figure on the construction. In general, it is best to have the majority of these questions settled at the start.

It is no wonder that the factory superintendent and others become confused when they are told facts in which they must see that there are elements of truth, but which become essentially contradictory when each is given the weight that is often demanded. It is easy for a salesman to find good points in his apparatus and points in his competitors' apparatus which are either weak in themselves or which under some conditions might be objectionable. The question as to the importance of each of these facts is what makes it impossible for a person not familiar with the subject to decide these questions with confidence.

There is a very curious result which sometimes develops, namely: That the man who knows nothing at all about the subject may be able to draw better conclusions or judge more accurately as to the weight that should be given to the various points to be considered than a man who knows a little about the subject, but who has not had a wide and varied experience. A man who has had no experience or a minimum of experience is very likely to come to his conclusions by judging the men with whom he talks and if the men with whom he talks know something about the subject and if he can discriminate or if he is a good judge of men, he may reach a general conclusion very close to the truth.

A man is often prejudiced by his experience and does not for this reason give all sides of the question fair consideration. This is the more especially true of the man who has had quite a little experience in one line and practically no experience in an associated line. For instance, a man who has had considerable experience in the heating of buildings of just one class is very likely to err when handling the heating of buildings in another class, even if the classes are similar, for the reason that small points may be overlooked which sometimes produce opposite results to those expected. Operating engineers of small experience are prone to this error. They discover that something is true in one plant; they assume the reason and in applying this reason to another plant they may fall into grievous error.

Probably a more common way, however, in which errors are made in design is when apparatus, which has been used under certain conditions, is used under new and slightly different conditions. There are on the market certain flanges, valves, etc., rated for a working pressure of 150 lb. per square inch. In the smaller sizes these may give satisfaction and even in the larger sizes they may pass muster under test conditions, while for working conditions they should not be used for such pressures. In fact, one can name some of the largest institutions around New York City where such apparatus has been installed and failed so utterly under a regular working pressure of 125 lb. per square inch that it had to be entirely removed and replaced within a short time after its installation.

This apparatus had given good satisfaction under somewhat lower pressures, but the increase in pressure to 125 lb. had rendered it so unsatisfactory that it had to be removed. The manufacturer claimed in one case that the trouble was due entirely to the design of the piping and it was the expansion strains that caused the trouble. This, undoubtedly, was partly true, but expansion strains of some magnitude are to be expected in ordinary steam piping and the flanges, etc., should stand reasonable expansion strains.

The general design and arrangement of the heating apparatus is of prime importance and these questions must first be considered in the general scheme of a new factory. Let us then consider briefly each of these questions:

Questions to Be Answered in Considering the Heating Problem

1. Shall we use exhaust steam heating?
2. Shall we use condensing engines?
3. Can the engine exhaust be used in processes other than heating, and, if so, what is its value?
4. What is the value of a vacuum heating system?
5. Are there advantages in forced hot-water heating?
6. How much heating surface will be required, and what is its equivalent in boiler horse-power?
7. Shall we use gas or oil engines?

1. Shall We Use Exhaust Steam Heating?

The steam engine uses, roughly from 10 to 20 per cent. of the heat in the steam. This leaves from 80 to 90 per cent. of the heat, which remains in the exhaust steam to be discharged from the engine. Under proper conditions practically all of this 80 to 90 per cent. of the original heat can be used in exhaust steam heating. If the exhaust is from ordinary pumps, the heat remaining in the steam after doing its work in the pumps is about 95 per cent. of the original heat.

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When considering exhaust steam heating we must remember that we cannot use exhaust steam during the warmer weather and that, if the exhaust steam available is just equal to what is required in the coldest weather, only about one-half of this amount can be used advantageously in the more moderate or average winter weather. When we can use the exhaust steam effectively in heating we have nearly perfect thermal efficiency in the use of the steam. The question, therefore, of prime importance in exhaust steam heating is what is the proportion of the time during which we can use all of the exhaust steam effectively in heating or how much of the exhaust steam can we use in heating?

There is no difficulty in circulating the exhaust steam for distances up to at least one-half mile, although the most economical pipe sizes, etc., should be carefully considered. The question of the removal of the grease from the exhaust steam is also very important, although it may be classed as one of the details; a detail, however, which, if not properly attended to, may ruin the apparatus and boilers.

2. Shall We Use Condensing Engines?

Condensers increase the economy of a steam engine from 20 to 35 per cent. A good supply of condensing water should generally be available, if a condenser is to be used.

Most engines cannot run very well condensing a part of the time and non-condensing at other times, so that the use of condensing engines will in many cases eliminate the use of exhaust steam in heating. This is also true to some extent of steam turbines. In speaking of steam turbines, we may here mention the fact that steam turbines, when running non-condensing, have generally a higher steam consumption than steam engines.

When run condensing the steam economy of the steam engine and turbine may be, roughly, said to be about the same. The gain in economy as between a non-condensing and a condensing unit is considerably greater, therefore, for a turbine than for an engine. To go back to our original question, however, we must decide, when considering the condensing or the non-condensing engine, whether the gain in economy throughout the year more than offsets the gain in the use of the exhaust steam in the heating apparatus or in special cases in other apparatus and whether it is worth while to use the extra machinery required.

3. Can the Engine Exhaust Be Used in Processes Other Than Heating and What Is Its Value?

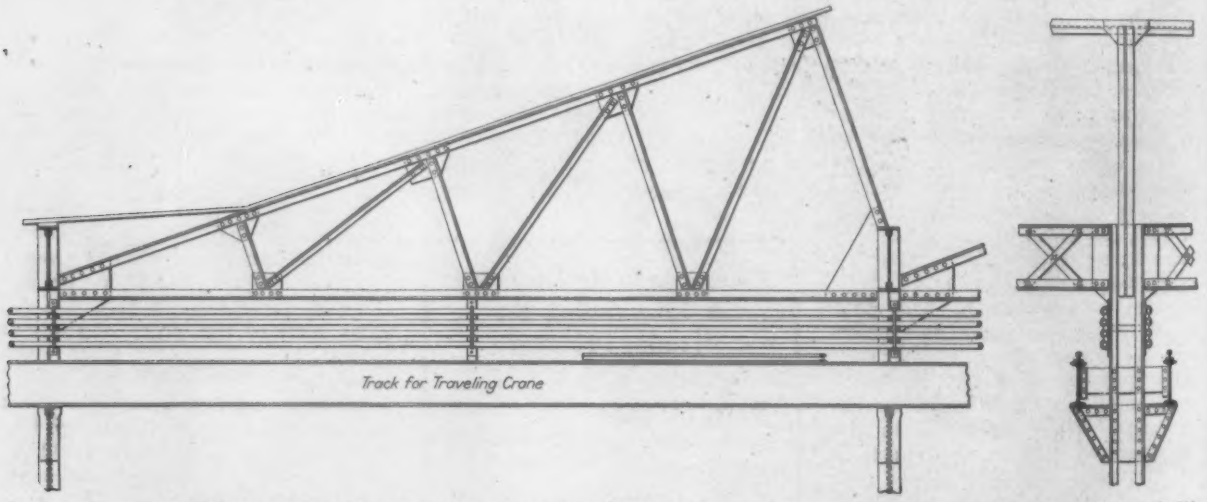
This question must be considered with reference to each particular case. In general, however, exhaust steam can be used for processes such as drying, steaming, cooking, boiling, and even for refrigeration, etc. In many industries, one is told that exhaust steam cannot be used and while this is sometimes so, the truth is usually on the other side and may constitute one of the largest possible economies that can be made about a plant.

In regard to the economy of the exhaust steam thus utilized, we may say that it is about the same as the economy in the use of exhaust steam heating except that, where these processes are continuous, the exhaust steam may be used summer and winter instead of during the winter only. In other words, we raise the thermal efficiency in the use of the steam from a point somewhere between 10 and 20 per cent. to approximately 100 per cent. The question then becomes how much exhaust steam can we use in this manner, and during how many hours does the process continue?

The question as to how much of the exhaust steam can be used in this manner may often be solved, especially in such cases as boiling, drying, etc., by figuring that for every pound of water changed from water to a vapor or removed (as where a fabric loses weight by drying), approximately 1 lb. of steam must be condensed for each pound of water thus removed from the fabric. Where water is merely heated, 1 lb. of steam will heat approximately 1000 lb. of water 1 deg. F., or 500 lb. 2 deg. F., or 100 lb. 10 deg. F., etc.

4. What Is the Value of a Vacuum Heating System?

Theoretically vacuum systems are enticing. Practically they are of value in many cases. You cannot get something for nothing, however, and it ordinarily takes more or less power and additional machinery to operate one of these systems. In some cases it is worth while to place a vacuum on the air valves or air line connected therewith. In some cases it is worth while to place a vacuum on the return line. In some cases a condenser trap is an essential part of a simple vacuum system.



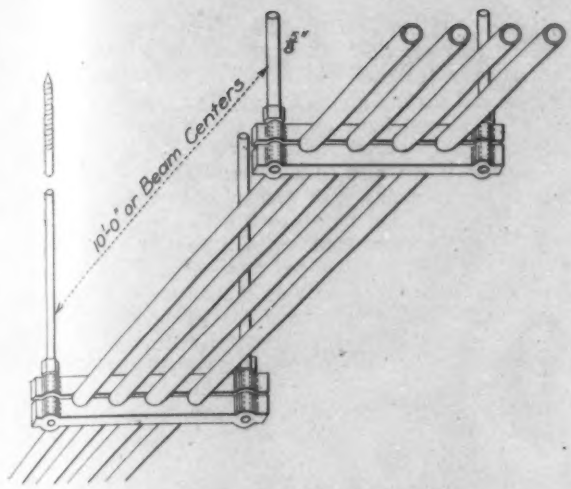
Overhead Coil Pipes Under Saw-Tooth Roof, Avoiding Track for Traveling Crane, in Shops of Lane & Bodley Company, Cincinnati, Ohio

Where there are inferior automatic valves placed on the return ends of radiators and coils in order to allow water and air to escape, but not to allow steam to pass into the return pipes, the vacuum system may become very wasteful. A few years ago many engineers thought that all of these automatic valves were more or less defective, and while of recent years some good valves have been developed, the majority of these valves should not be tolerated. The gain in engine economy due to the lessening of the back pressure on an engine by means of a vacuum system is ordinarily fictitious.

There are in this connection two principal cases to be considered: 1. The case in which there is less exhaust steam than that required by the heating system. 2. The case in which there is more exhaust steam than that required by the heating system.

In the first case, where there is less exhaust steam than that required by the heating system, a gain in economy in the engine means less exhaust steam for the heating system, and as there is not enough in any case, a gain in economy in the engine merely means that more live steam must be added to the heating system so that the total gain in economy is practically nothing at all.

In the second case where there is more exhaust steam than that required by the heating system there are two conditions to be considered: (a) The condition in which the excess exhaust steam is discharged into the atmosphere. (b) The condition in which the excess exhaust steam is discharged into a condenser.



Detail of Factory Overhead Heating Coils

If the excess exhaust steam is discharged into the atmosphere (called atmospheric exhaust) an additional pound or so should generally suffice for the heating apparatus. The use of a vacuum system to save this pound or so in pressure would probably offset with its apparatus the value of this added back pressure.

Let us then consider the second condition, namely, that in which the excess exhaust steam is discharged into a condenser. We should remember in this connection that when the vacuum is placed on the return pipes with an automatic valve at the return end of each radiator and coil, there must be an appreciable difference in pressure between the steam in the radiator and coils and the pressure in the return pipes. The automatic valves separate the two. The vacuum maintained on the return pipes, even if nearly perfect, would still require perhaps 5 lb. additional pressure in the radiators and coils (so as to overcome fluctuations at these low pressures as well as drop in pressure in the heating system) so that the extremely low vacuums sometimes claimed for the vacuum systems are usually impractical.

The condenser, also, if arranged to care for the excess of steam, must handle various amounts at various times, and this is likely to result in complications in the operation of the condenser. To suit best the conditions of the heating system it is also desirable to have the engine run at different times under different vacuums. This is usually not good for the engine, and complicates its adjustments, so that in many cases condensing engines cannot well be used with exhaust steam heating systems.

There are conditions, however, under which a part of the steam is sometimes taken from the engine after it has passed through the high-pressure cylinders and before it has reached the low-pressure cylinders and the steam thus taken may be used for heating. Such an arrangement, with varying demands for heating, would unbalance a steam turbine, however, much less than an engine and turbine manufacturers claim this as one of the advantages of their apparatus.

Vacuum systems may reduce the temperature in the heaters somewhat and this is often desirable with coils which are comparatively close to the heads of employees or others. We must remember, however, that the temperatures drop off slowly with a lessening of the pressures and that the low temperatures come only with very, very low pressures—pressures, in fact, which usually cannot be obtained in practice.

The graduation of the steam heat with the vacuum system by partially heating a radiator or coil, by choking the steam inlet, is absolutely impractical with the ordinary steam valve and while this can be done if special inlet valves are provided, it is often found that such valves are not used by the operators or employees in the ordinary factory, even if the owners go to the additional expense of their installation.

The vacuum system is often very effective in remedying trouble in a badly designed or poorly installed heating plant, but it is not a panacea for all ills and judgment should be used in its installation. The question, therefore, in vacuum heating systems is whether the advantages of the vacuum heating system are worth the extra cost. They may be if a nice running, quick heating plant is desired. If a vacuum heating system is used, however, the best is none too good.

5. Are There Advantages in Forced Hot-Water Heating?

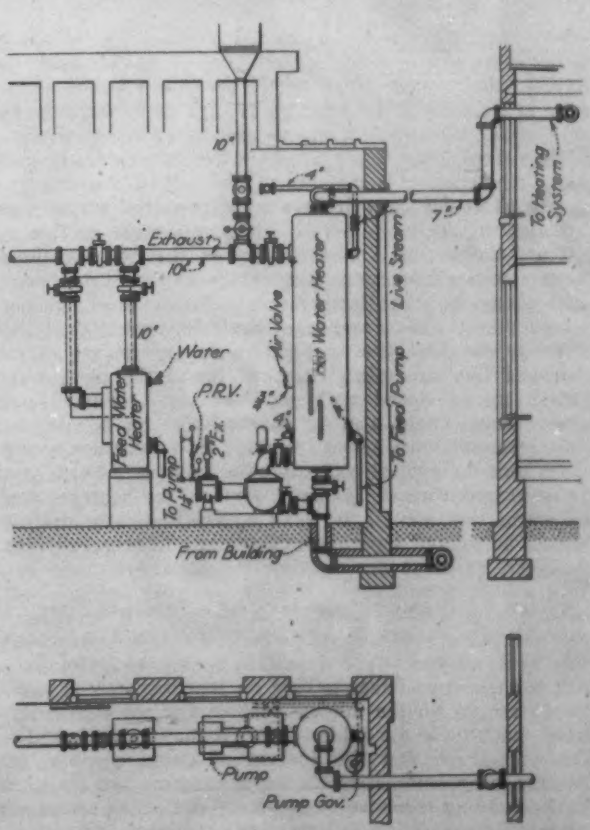
Hot-water heating has certain advantages, especially for large institutions or groups of buildings. In such cases a forced hot-water heating system is often used. The power required for such a system can be made small where the exhaust steam from the pumps can be used in heating the water. Heating by hot water enables the heat from the exhaust steam to be carried long distances, while the exhaust steam can be condensed near the engines and return at once to the boilers.

Hot-water heating requires a little larger radiation, but it is much more conveniently regulated than steam for varying weather conditions both by changing the temperature of the water in the entire system or in a single radiator. Hot-water heating enables one also to store up a certain amount of heat so that the heat of the exhaust steam can be utilized to better advantage if the amount of exhaust steam available is more or less varying.

The question, then, in hot-water heating is whether a little more money can be spent at the start for an apparatus which may be somewhat more economical in operation and in many cases much more satisfactory in use. Where there are old buildings already equipped with steam, it may not be desirable to use hot-water heating. The question as to the static pressure of the water and the possibility of freezing are details which should be settled right, but which are capable of a satisfactory solution.

6. How Much Heating Surface Will We Require and What Is Its Equivalent in Boiler Horsepower?

Roughly, we may say that 1 sq. ft. of glass surface (under ordinary differences of temperatures) loses 1 B.t.u. per square foot per hour per 1 deg. F. difference in temperature, while 1 sq. ft. of wall surface loses about ¼ B.t.u. When, however, a wind is blowing, the loss, especially through the glass, is increased. There is also a certain amount of air leakage which may sometimes become of much more importance than any other factor. The air leakage ordinarily is approximately proportional to the glass surface, so that, if we double the heat



Arrangement of Engine Room Piping and Pump for Forced Hot-Water Heating System as Installed for Housatonic Mfg. Company, New Haven, Conn.

loss through the glass in order to allow for air leakage, etc., we will have 2 B.t.u. per square foot of glass per hour per 1 deg. F. difference in temperature. If we now take one-eighth of the exposed wall surface we can rate that also at 2 B.t.u. per square foot per hour per 1 deg. Fahr. difference in temperature, since each square foot of wall surface loses about ¼ B.t.u. If, therefore, we take the glass surface plus one-eighth the exposed wall surface, we may call this glass equivalent and rate its loss at 2 B.t.u. per square foot per hour per 1 deg. Fahr. difference in temperature.

The ordinary two-column 38-in. high direct radiator loses about 1⅔ B.t.u. per square foot per hour per degree difference in temperature, while wall coils if not too many pipes or too close together may give up 2½ B.t.u. per square foot per hour per degree difference in temperature.

If now the temperature out-of-doors is zero and the temperature of the room is 70 deg., while the temperature of the steam is 212 deg., we would have $2 \times (70 - 0) =$ 140 B.t.u. lost per hour per square foot of glass equivalent. With two-column direct radiators 38 in. high, we would have $1\frac{2}{3} \times (212 - 70) = 236\frac{2}{3}$ B.t.u. lost per hour per square foot, and with coil surface giving up 2½ B.t.u. per square foot per hour we would have $2\frac{1}{2} \times (212 - 70) =$ 355 B.t.u. lost per hour per square foot.

For the two-column radiators, therefore, we should have surface equal to $140 \div 236\frac{2}{3} =$ (approximately) 0.6, or 60 per cent. of the glass equivalent and for the cooil surface we should have surface equal to $140 \div 355 =$ (approximately) 0.4, or 40 per cent. of the glass equivalent.

Where the building is allowed to cool off at night and must be heated up in the morning the 60 and 40 per cent. are often increased to 70 and 50 per cent. On the other hand, with buildings where the leakage is a minimum, where they are not in an exposed position, and where it is not necessary to warm the building up quickly after its having once cooled off, or where perhaps it is not necessary to maintain a temperature as high as 70 deg., the 60 per cent. and 40 per cent. may be reduced to lower amounts.

In greenhouses, for example, where a practically uniform temperature is maintained and where temperatures as low as 55 deg. may perhaps be allowed, coil surfaces as little as 20 per cent. of the glass equivalent surface is often installed. It is a fact, however, that we sometimes have found greenhouses that could not be heated on a windy day with the temperature a little above freezing, where these same greenhouses could be heated easily on a windy day with the temperature below freezing (since most of the air leakage cracks around the glass were frozen up or closed with snow or ice). These same greenhouses would also be easy to heat on a cold day (temperature much below freezing) if it were not windy.

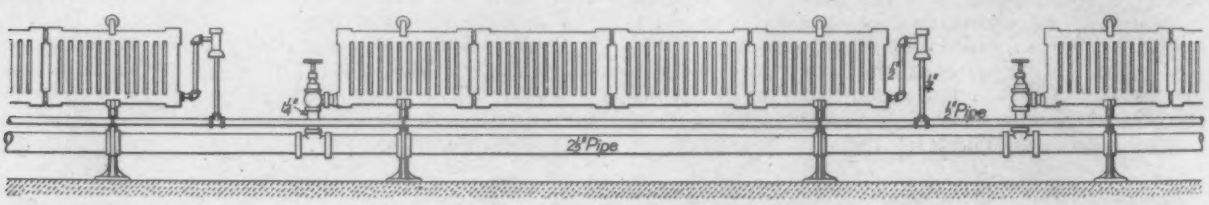
Where the cubical contents of a building is very large as compared with the exposed surface, the heat required to warm this air (if it is to be intermittently heated) should be figured separately. For most factory buildings, however, 40 to 50 per cent. of the glass equivalent surface will be found ample if coils are used and this will, in fact, have a little factor of safety which is very desirable in heating apparatus, but which is usually most noticeable by its absence. We should, of course, be able to control our heating surface to turn on approximately as much as we require in the milder weather, but we should also have enough for the colder days. It may be remarked in this connection that the amount of steam required for heating is approximately the same, whether the air within the building is heated at one point and blown to various parts of the building or steam is condensed within coils distributed through the building.

One boiler horsepower is equivalent to the evaporation of 30 lb. of water per hour, or approximately 30,000 B.t.u. per hour. If our radiating surface gives off 300 B.t.u. per square foot per hour, there should be at least one boiler horsepower for each 100 sq. ft. of radiating surface. If we use coil surface giving off 355 B.t.u. per hour per square foot we should have at least one boiler horsepower for $30{,}000 \div 355 =$ (approximately) 80 sq. ft. of radiating surface. Or, if we wish to allow, roughly, for some condensation in the mains with perhaps a little factor of safety in addition, we can figure each square foot of surface at 500 B.t.u. per hour and we will have one boiler horsepower for each $30{,}000 \div 500 = 60$ sq. ft. of radiating surface. In other words, divide the square feet of coil surface by 60 and it will equal the minimum boiler horsepower required. This does not refer to coil surface when air is blown past it with a fan, as such coil surface may give up twice or even four times the 500 B.t.u. per square foot per hour. The condensation from such surface should be figured from the air which is blown past the same.

7. Shall We Use Gas or Oil Engines?

The Edison companies which furnish light and power service in our large cities do not seem to have found it desirable as yet to change their motive power from steam to gas. There is no question, however, but that power can be produced more cheaply by gas or oil engines than by steam engines in many factories where very little exhaust steam would be utilized for heating or in other processes. The solution usually involves a question as to cost of coal, size and location of plant, etc., and a question as to how much exhaust steam can be used in heating, drying or manufacturing processes.

The waste heat of the gas engine may some day be effectively utilized and in particular installations it may be possible to so utilize it, but at present it is largely wasted. The waste heat of the steam engine is, however, now often utilized and where this heat can be used very high thermal efficiencies (or, in other words, very low operating costs) may be obtained.



One Pipe Wall Radiator Between Wall and Work Benches as Installed for the Winchester Repeating Arms Company, New Haven, Conn. The Heaters May be Shut Off Individually or in Groups

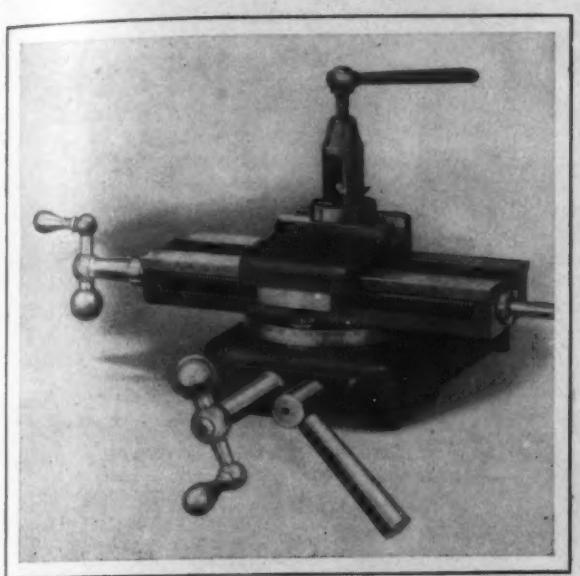
Sheet and Tin Plate Jobbers and Manufacturers to Confer

The National Hardware Association of the United States will convene in Pittsburgh, Pa., May 6 and 7. An invitation has been extended to all jobbers of tin plate and metals, whether members of the association or not, to attend the meeting May 6 for the purpose of formulating plans to bring about a strengthening of the relations of manufacturers and jobbers of sheets and tin plates. The manufacturers of sheets and tin plates are to be invited to be in Pittsburgh on the succeeding day to meet the jobbers for the purpose of considering the plans to be presented by the latter. It is stated that the conference will be of vital importance to every manufacturer and jobber of sheets and tin plates. T. James Fernley, 505 Arch street, Philadelphia, Pa., secretary-treasurer of the National Hardware Association, states that manufacturers who have been thus far approached seem as anxious for this gathering as do the jobbers.

The Lansing Company, Lansing, Mich., has recently put on the market an all-steel mortar tub for the use of contractors. It is claimed that this tub has many advantages over the old-style wooden box. It is lighter, since it will not absorb water; neater in appearance; cleaner, since mortar will not adhere to it; cheaper in the long run, since it will outwear three wooden boxes. As several of these tubs can be nested in moving them from job to job, they are more easily and conveniently handled. They are made from heavy sheet steel.

An Improved Lathe Slide Rest

For use in connection with its 11-in. lathe, the J. G. Blount Company, Everett, Mass., has recently brought out a new and improved slide rest. All the up-to-date



A New Type of Slide Rest for Lathes Made by the J. G. Blount Company, Everett, Mass.

features of a tool of this kind are said to be embodied in its construction, and it is so designed that both the cross and the lateral feed screws are not exposed to chips and dirt.

The graduated dial for indicating the amount of swiveling is located between the upper and the lower slide. In holding it in position the same construction as that employed on an engine lathe carriage is used; namely, two T-bolts. An eccentric clamping device, which is a distinctive feature of this line, is employed to fasten the rest rigidly to the bed of the lathe. If desired, the handle for the lateral feed screw can be used on either end, as it is detachable.

The cross and lateral feeds for the rest are 5½ and 7½ in. respectively. The rest will accommodate tools measuring 7/16 x ¾ in. in section, and will permit a piece of work 7½ in. in diameter to be swung over it.

Cisco Lead Coated Sheets.

The Cincinnati Iron & Steel Company, Cincinnati, Ohio, has issued a booklet entitled "Cisco Led Kote," describing a new material for roofing which it has brought out. This material is composed of open-hearth sheet steel with a coating of practically pure lead. The company states that under its own patented process the coating is applied without any alloy of tin or zinc, and it is claimed to be the only process in which pure lead has been applied to steel without any alloy. The statement is further made that the metal can be shaped or formed in the most tortuous manner without injuring the coating or the sheet and that it is not affected by sulphuric or sulphurous fumes or by any destructive elements of atmospheric conditions. It is made in gauges running from 16 to 30, inclusive, and in standard widths and lengths of sheets, corresponding with galvanized sheets, from 24 x 72 to 30 x 120 in., inclusive. Its weight is about 0.03 lb. per sq. ft. heavier than galvanized.

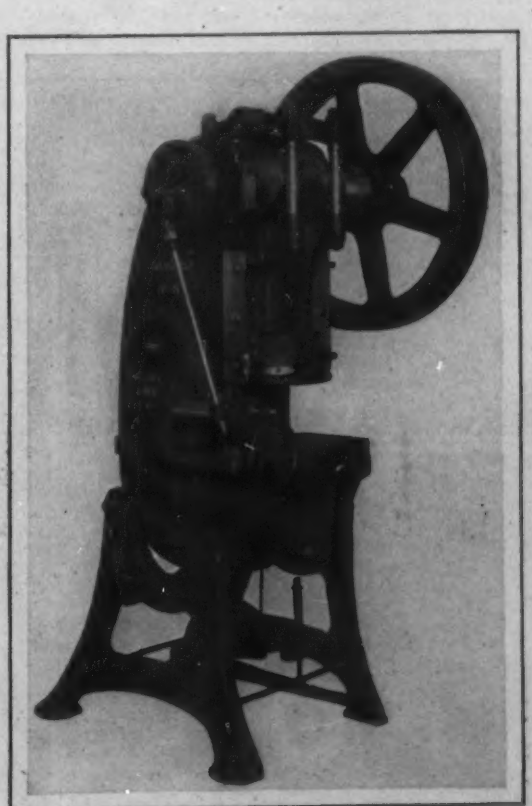
The National Association of Stove Manufacturers will hold its forty-first annual meeting at Hotel Pontchartrain, Detroit, Mich., May 8 and 9. Abram C. Mott, president Abram Cox Stove Company, Philadelphia, is president of the association, and E. C. Hanrahan, Auditorium Tower, Chicago, is secretary.

The Rochester Electric Motor Company announces the removal of its office and salesrooms to the new plant at 266 Lyell avenue, Rochester, N. Y. This brings all the departments of the company under one roof, the factory having been moved to this location last November.

Double-Acting Cam Press

Recently the Niagara Machine & Tool Works, 639 Northland avenue, Buffalo, N. Y., has increased its line of presses by the addition of a double-action cam press. This new machine is intended for cutting and drawing shells and possesses several new and interesting features among which are the use of a threaded sleeve at the lower end of the blank holder slide for adjusting this part. Several sizes of press are built and the accompanying engraving shows what the maker terms its No. 85 Niagara cam press equipped with a single roll feed attachment.

A threaded sleeve is used on the lower end of the blank holder slide for adjusting this part readily and accurately to accommodate dies of various hights instead of by screws connected to the yokes of the cam roller. With this arrangement it is pointed out that it is



A New Double-Acting Cam Press with Roll Feed Built by the Niagara Machine & Tool Works, Buffalo, N. Y.

possible to bring the guides for the blank holder slide directly in line with center of the crank shaft. Another feature of the new press is the use of adjustable gibs, not only for the blank holder slide, but also for the inner one. In other respects the construction of the new machine follows the latest standards.

The outer slide or blank holder is positive in its motion and is raised or lowered by two cams keyed to the main shaft alongside of the crank. The inner slide receives its motion from the crank shaft by a pitman which has a vertical adjustment. The yokes of the cam roller are rigidly connected with the blank holder and provision is made to take up wear. The lower cam rollers are set in oil boxes to insure perfect lubrication for the rollers and the cams.

The Edwards Mfg. Company, Cincinnati, Ohio, has opened a branch house in Dallas, Texas, located at 1625-1627 Pacific avenue. That branch has now on hand approximately 4000 squares of steel ceilings of various patterns, including the moldings, and in the near future expects to carry a complete line of metal shingles, Spanish tile, eaves trough, conductor pipe and imitation brick and stone siding; in fact, a full line of sheet metal building material. J. F. Agnew, who has represented the company for several years in Texas, will be in full charge of the Dallas warehouse.

The New Dry Blast at Standish, N. Y.

Plant of Northern Iron Company Extracting Moisture From the Air After Compression by Sprays of Water and Sprays of Brine

BY JOHN B. MILES

Since James Gayley in 1904 gave to the world the results of the operation of his refrigerating dry blast process no marked deviation has occurred from the type of apparatus devised by him. The dry blast plant of the Northern Iron Company, built at Standish, N. Y., in the summer and fall of 1911, is of interest, since the process, here employed for the first time, differs in essentials from any other process that has been tried in practice. The cooling is done after compression in the blowing engines, and sprays of water or brine, in direct contact with the air, accomplish the cooling instead of pipes in which cold brine is circulated. The plant has a capacity of 20,000 cu. ft. of free air.

Fig. 1—General View of Furnace Plant. Fig. 2—Lean-to Containing Cooling Plant, Showing 180-Deg. Bend in Blast Pipe

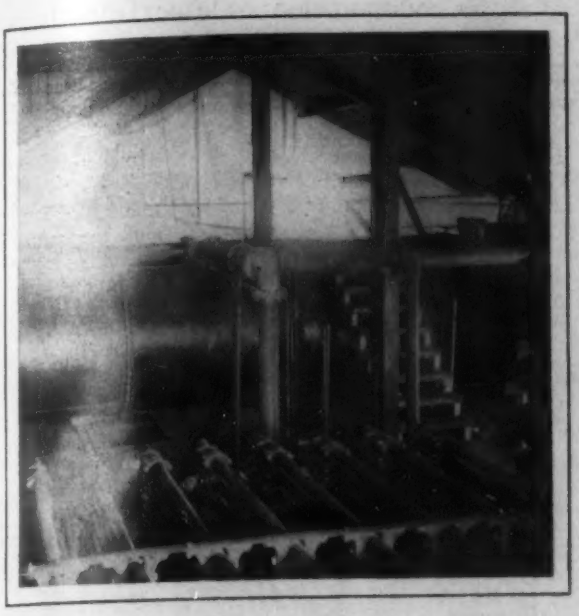
Fig. 3—View Showing the Branch Pipe from the Cold Blast Main to the Cooling Plant in the Background and the Returning Air Pipe from the Cooling Plant

In the summer, when the brook water used is at 60 deg. F., the compressed air will be cooled from 180 deg. to 65 deg. in the first stage, and from 65 to 28 deg. in the second stage, reducing the moisture, if the blast pressure is 10 lb. per square inch, from 8½ grains to 1 grain per cu. ft. of free or expanded air. Cooling after compression requires much less capacity of apparatus and less steam for its operation than any possible process in which the cooling is done before compression, as in the case of the various dry blast plants in this country and abroad. Since water from a natural source can be used for the greater part of the cooling, the size and cost of the refrigerating apparatus is much reduced, and with it the size and cost of the buildings. This process does not depend upon the use of unusually cold water, since its advantages can be demonstrated even with water of the temperature found in most of our rivers during the summer months.

The refrigerating apparatus, furnished by the Carbondale Machine Company, is of the ammonia absorption type and uses exhaust steam from the pumps, except for the aqua ammonia pump. At this furnace, where there is an abundant supply of exhaust steam, the steam requirements of the dry-blast plant are so small as to be practically negligible. The cooling chambers were furnished by the Carrier Air Conditioning Company, including the spray nozzles and piping and the eliminators.

The accompanying photographs indicate the smallness of the plant, the house being only 60 x 30 ft. in plan and attached as a lean-to to the blowing engine house. The pumps, for water, brine, and aqua ammonia, the absorber generator and Baudelot cooler of the refrigerating apparatus and an evaporator for the brine are located on the first floor. The first and second stage coolers, the ammonia condenser, interchanger, weak liquor cooler, etc., are located on the second floor or gallery.

As can be seen in Fig. 3, the air leaves the cold blast main and passes to the first stage cooler, which is 48 ft. long. It then passes through a bend of 180 deg., outside of the building, and returns through the second stage cooler, 36 ft. long, to the cold blast main. These coolers are divided into compartments with an eliminator at the end of each. The arrangement uses the water efficiently, the air being reduced, in the last compartments of each stage, to within a few degrees of the temperature of the entering water or brine. At the end of the second stage are located a thermometer well with mercury thermometer and the resistance bulb of a Leeds & Northrup electric



Second Floor of the Cooling House Showing the First Stage Cooler and in the Foreground the Condenser for the Ammonia

thermometer by which the temperature of the outgoing air is read at the desk in the dry-blast room. In addition, a Bristol recorder, which is located at the desk, shows the outgoing air temperature at all times, as well as furnishing a record of each day's operations when taken in connection with the pressure chart.

From each stage the water or brine flows to a drum in which are floats controlling the drain valves. The water from the first stage passes to the suction well of the pumps, which furnish the furnace supply, and the brine from the second stage flows over the Baudelot cooler into a well and from thence is drawn by the pumps and returned to the second stage. As the moisture removed from the air in the second stage passes into the brine, it is necessary to remove, by boiling, an equal amount from the brine. This is accomplished by means of an evaporator using exhaust steam, and the steam from the brine is condensed in a small Dean jet condenser. The cold brine to the evaporator and the hot brine drawn from it pass through the interchanger, shown on the wall, in Fig. 5.

Table I—Daily Report of Operation of Dry Blast Plant, Northern Iron Company, Standish, N. Y., Day Ending April 1, 1912.

Time	Bustle Pipe			Dried Air				
	Dry bulb	Wet bulb	Grains	Dry bulb	Wet bulb	Grains	Pressure lb. sq. in.	Temp.
6 A. M.	..	..	..	75	51	1.36	12.5	36
7 A. M.	53	40	1.29	75	50.5	1.24	14	35.7
8 A. M.	51	39	1.29	74.5	50.5	1.29	12.	36.3
9 A. M.	53.5	40	1.24	75	50.5	1.24	12.5	35.3
10 A. M.	53.5	40	1.24	75	50.5	1.24	13.5	37
11 A. M.	54.5	41	1.24	76	51	1.24	13.5	36.5
12 M.	55	41.5	1.39	78.5	52	1.21	11.25	34.5
1 P. M.	56:5	42	1.32	79.5	52.5	1.26	10.25	33.5
2 P. M.	..	..	..	79.5	52.5	1.26	10	34.5
3 P. M.	60	44	1.36	79	52.5	1.29	12	36
4 P. M.	60.5	44	1.29	79.5	52.5	1.26	11	34.5
5 P. M.	52	38.5	1.29	79.5	52.5	1.29	11	35
6 P. M.	..	..	..	78	52	1.29	12	35
7 P. M.	..	..	..	76	51	1.24	13	36
8 P. M.	55	41	1.29	75	50.5	1.24	14	36.5
9 P. M.	..	..	..	75	50.5	1.24	13.5	36.5
10 P. M.	54	41.5	1.32	74	50	1.24	12.5	36
11 P. M.	..	..	..	74	50.5	1.36	12	35.5
12 Night	55	41	1.29	72	49.5	1.29	12.5	35.5
1 A. M.	..	..	..	70.5	48.5	1.26	11.5	35
2 A. M.	45	36	1.32	70.5	48.5	1.26	13.75	35.5
3 A. M.	43	34.5	1.26	69.5	48	1.24	12	35.5
4 A. M.	41	33	1.24	69	48	1.24	12	35.5
5 A. M.	..	..	..	68	47.5	1.29	11	36.5

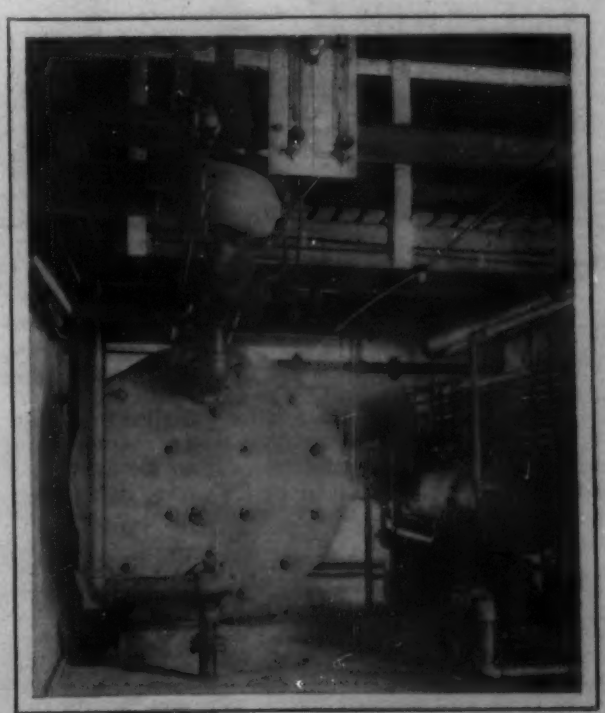
In Table I is given part of the record or log for the day ending April 1, 1912. Particular attention is called to the readings of moisture taken from a connection on the bustle pipe and their close agreement with those taken in the dry-blast room. The air sampled at the bustle pipe has been heated in the stoves to 1100 deg. or more and cooled down by passing through a pipe coil to such a temperature as will permit of dry and wet bulb readings. If any entrained moisture were carried with the air from the second stage its presence would be detected in these readings. The close agreement of the readings with the moisture calculated from the temperature and pressure of the air leaving the second stage proves conclusively that the end eliminator removes practically all of the entrained moisture.

At present, on account of some improper action of a spring forming part of the mixing valve mechanism, the automatic controller, which will eventually regulate the temperature of the outgoing air, has not yet been put in use. The remarkable regularity of the moisture readings shows the ease with which the necessary regulation is accomplished by means of hand control of the two pumps.

Table II is a sample engine room record, and illustrates the method of obtaining regularity in the quantity of air in pounds delivered to the furnace, the speed of each engine being changed each hour, if the change in the temperature of the air entering the blowing cylinders requires it. By means of the electric thermometer the temperature of the air entering the blowing cylinders is read hourly in the dry-blast house, and the necessary correction made from a chart. The revolutions ordered by the furnace manager are assumed to be based on an arbitrary temperature of 50 deg., and the engines are run faster or slower, as the air is warmer or colder than the standard.

Table II—Figures from the Daily Report of Operations in Blowing Engine House, Northern Iron Company, Standish, N. Y.—Day Ending April 6, 1912.

Time	Blowing Engine No. 1				Blowing Engine No. 2					
	R.p.m. ordered	Air temp. degrees, F.	Correct r.p.m.	R.p.m. made	R.p.m. ordered	Air temp. degrees, F.	Correct r.p.m.	R.p.m. made	Steam pressure, lb.	Air pressure, lb.
6 A. M.	40	56	40	..	32	90	34	..	110	12
7 A. M.	40	60	40	40	32	87	34	34	110	11.5
8 A. M.	40	60	40	40	32	86	34	34	110	12
9 A. M.	40	65	41	40	32	90	34	34	110	8
10 A. M.	40	70	41	42.5	32	87	34	34	110	11.5
11 A. M.	40	73	42	40	32	91	34	34	110	12
12 M.	40	75	41	42	32	92	34	34	110	11.5
1 P. M.	40	75	42	40	32	93	34	34	110	11
2 P. M.	40	79	42	41.5	32	95	34	34	110	11.5
3 P. M.	40	75	42	42	32	96	34	34	110	11.5
4 P. M.	40	75	42	42	32	95	34	34	110	12
5 P. M.	40	74	42	42	32	95	34	34	110	12
6 P. M.	40	71	41	42	32	93	34	34	110	12
7 P. M.	40	67	41	39	32	88	34	34	110	12
8 P. M.	40	63	41	41	32	95	34	34	110	11
9 P. M.	40	62	41	41	32	95	34	34	110	11
10 P. M.	40	62	41	41	32	96.5	34	34	110	11
11 P. M.	40	61	41	41	32	96	34	34	110	11
12 Night	40	61	41	41	32	94.5	34	34	110	8
1 A. M.	40	59	41	40	32	94.5	34	34	110	12
2 A. M.	40	60.5	41	41	32	95	34	34	110	12
3 A. M.	40	59.5	41	41	32	95	34	34	110	12
4 A. M.	40	59	41	41	32	93	34	34	110	12
5 A. M.	40	62	41	41	32	96.5	34	34	110	14

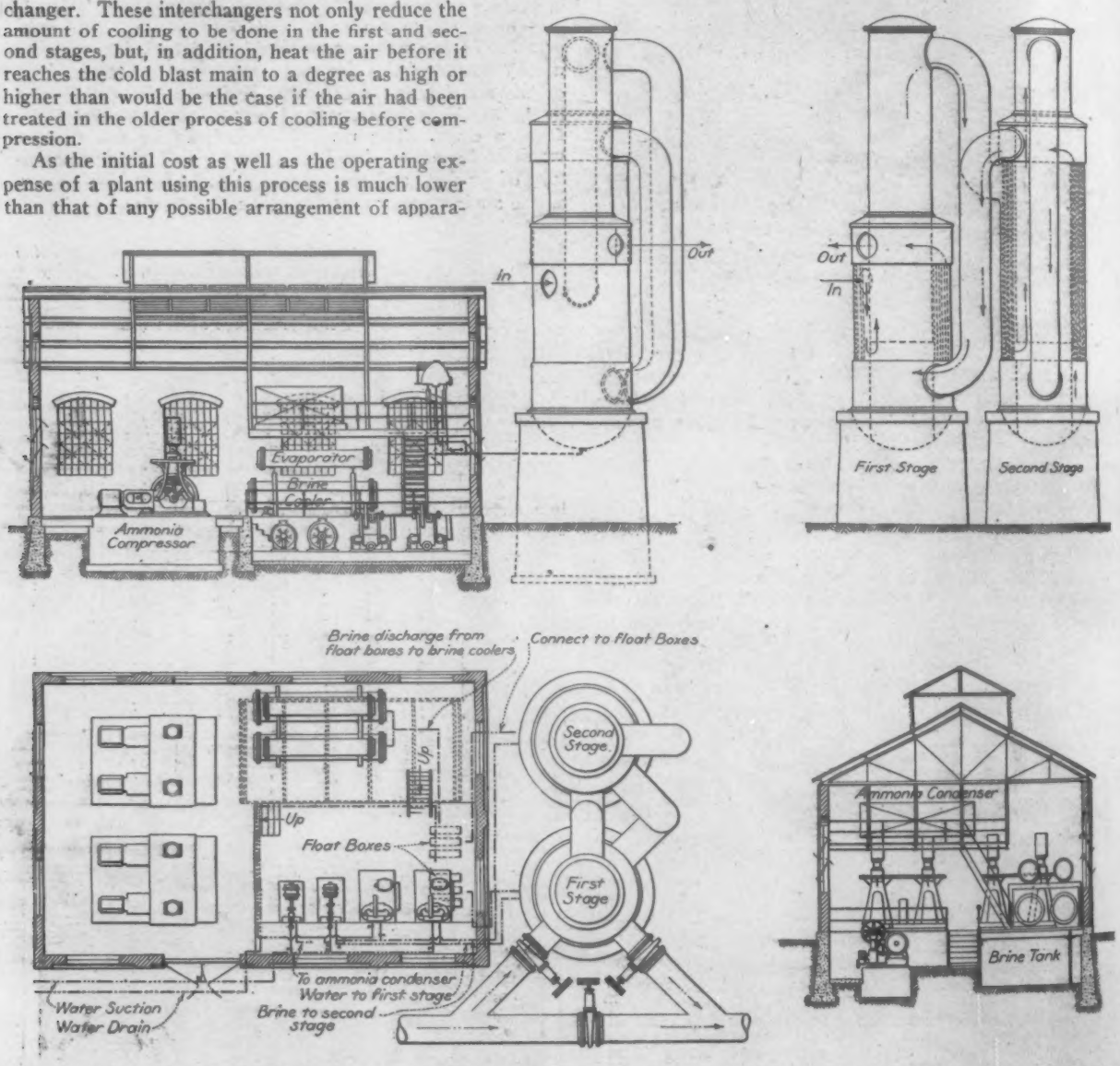


Ammonia Gas Generator at Left and Evaporator for Brine at Right in First Floor of Cooling House

It is not found necessary to change the speed frequently during the 24-hr. period. Engine No. 1 takes its air from outside through a pipe, and in consequence its speed must be changed more frequently than engine No. 2, the air supply to which is of more constant temperature as it comes from the engine room. As the dry-blast apparatus is operated by one man on each turn without difficulty, the operating expense should compare very favorably with that of any other process.

A somewhat modified arrangement for a 40,000 cu. ft. plant is shown, and attention called to the small amount of refrigerating apparatus required. The coolers are in the shape of towers, and each cooler is surrounded by an annular space in which are the tubes of an interchanger. These interchangers not only reduce the amount of cooling to be done in the first and second stages, but, in addition, heat the air before it reaches the cold blast main to a degree as high or higher than would be the case if the air had been treated in the older process of cooling before compression.

As the initial cost as well as the operating expense of a plant using this process is much lower than that of any possible arrangement of apparatus using cooling before compression, and only a fraction of that of the original type using pipes for cooling, it is believed that its introduction will result in a great extension of the use of dry blast. The great cost of plants of the older type has been the one factor which has prevented the universal adoption of dry blast though the dry blast has resulted in such a great decrease in coke consumption and increase of production of iron wherever it has been used.



Plan and Elevation Showing the Small Size of the Equipment and Buildings of the Dry Blast Apparatus for Handling 40,000 Cu. Ft. of Air

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The Allen-Bradley Company, 495-497 Clinton street, Milwaukee, Wis., has purchased the rheostat department of the American Electric Fuse Company, Muskegon, Mich., bankrupt, including all drawings, patterns, tools, dies, engineering data, patents, copyrights, trademarks, good will, books of account, mailing list, and other records. This, added to its own complete line of apparatus, insures the user that his future demands for compression electric controlling devices will be well taken care of.

Freight Transportation by Auto Trucks in Porto Rico

Up to the present time the motor truck has been regarded mainly as a freight-carrying institution suitable for city service.

It has, however, according to R. W. Hutchinson, Jr., New York, proved itself of greater efficiency than the railroad for certain conditions of moderate distance haulage. For example, a large general trucking corporation on the island of Porto Rico has decided to utilize motor trucks for haulage that can be considered in the long-distance class. This installation, comprising 30 trucks, has been made by the International Motor Company, manufacturer of the Mack, Saurer and Hewitt trucks.

The transportation of freight between the coast and the interior is at present carried on almost entirely by means of bull carts, and for shipments of less than carload lots bull carts are even competing with the railroads on roads parallel to the railroad lines. The business of the island is increasing at a rate varying from 16 to 25 per cent. per year, as shown by the reports of the customs service; and the need of an adequate system of transportation is becoming more and more imperative, particularly between the coast and the interior. There is a wide variation of rates charged for transportation by bull carts, the charge being 15 to 50 cents per ton-mile. The grades in the interior practically prohibit building railroads, and the solution of the handling of interior traffic is to be found only in the automobile truck. There are at present about 45 automobile trucks on the island

A Springless Indicating Scale

An automatic springless weighing machine with a dial indicator has been developed by the Kron Scale Company, 198 Broadway, New York City. This scale is the invention of a Swedish engineer, Wilhelm Simonsson, and is adapted for a large variety of uses, such as postal and household scales; counter scales, including the computing type; platform and railroad track scales of all capacities and all kinds of recording and computing scales. Quick, exact and automatic operation is claimed with the absence of springs and loose weights, freedom from adjustments for weighing between minimum and maximum capacities and the use of a curved surface which does not wear down in place of the familiar knife edge fulcrum in the balancing mechanism. A view of one of the large platform scales equipped with a tare beam which can be adjusted so as to have the net weight of the material indicated by a dial is shown in Fig. 1, while a diagram showing the principle of operation is reproduced in Fig. 2.

Referring to Fig. 2, *a* is the balance or pendulating lever suspended from a fulcrum block which is the essential feature of every type of Kron scale. The balance weight *b* is located at the end of the pendulating lever which is suspended on the fulcrum block *c*, by a flexible band of metal, *d*. The lever has a rocking movement on the fulcrum block and a draft bank of flexible metal, *e*, is fastened at one end to the balance lever and carried by the curved extension of it. It supports the scale pan or the article to be weighed at the other end. The ordinary position of these parts is shown at the left of Fig. 2, while when a load is placed on the scale pan, as is the view at the right, the stress is transmitted through the draft band *e* to the curved extension of the balance lever causing the weight *b* at the lower end to swing out and rock the lever *a*. This shifts the point of contact with the fulcrum block *c* and increases the length and leverage of the extended lever arm until equilibrium is restored.

Two of these units with their curved bands *e*, extending down between the two fulcrums and jointly supporting the weight of the scale pan are employed except in the very small postal scale. The simultaneous pull on the double weight balance levers, it is emphasized, gives an even uniform motion, and if any slight inequality of the surface on which the scale rests should throw it out of level, this unevenness will be taken up and equalized between the two scale units. In Fig. 2 the levers are shown resting directly upon the supporting bands, but in practice the under surfaces of the levers have parallel tracks which rest upon two rollers of slightly greater radius than the fulcrum blocks on which the supporting bands rest so that there is no pressure upon them. The curved fulcrum blocks which take the place of the knife edge fulcrum used in ordinary scales, it is pointed out, is not subject to wear or rust and is practically frictionless.

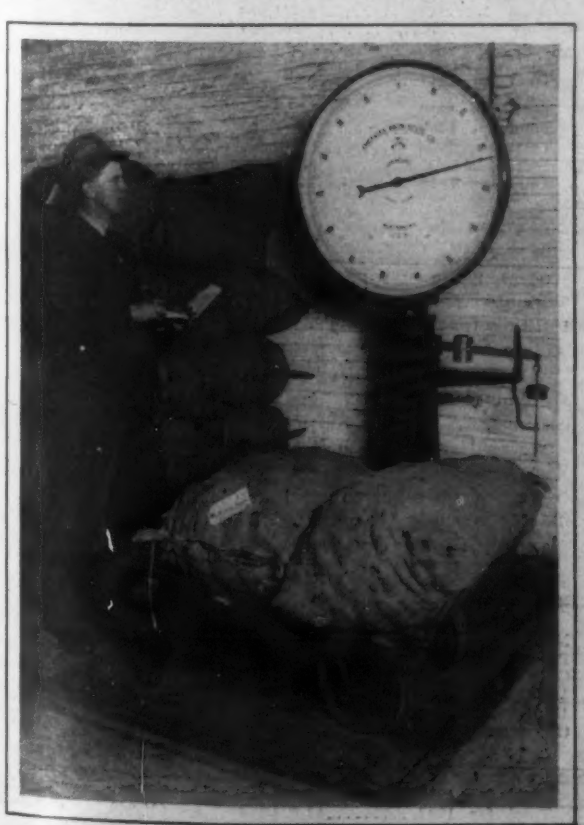


Fig. 1—A Springless Indicating Platform Scale Manufactured by the Kron Scale Company, New York City

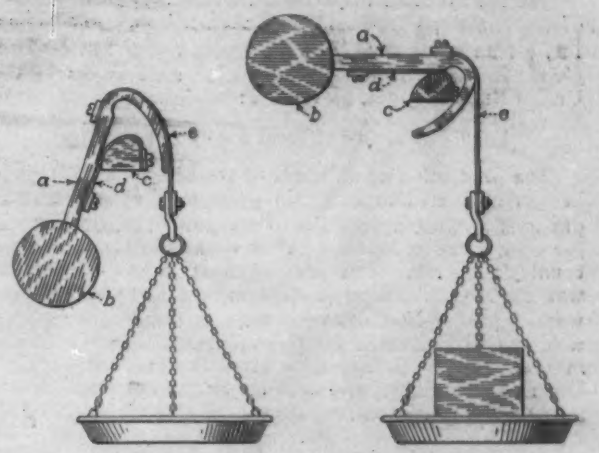


Fig. 2—Diagrams Showing the Principle of Operation

Southern Supply and Machinery Dealers' Meeting

The Southern Supply and Machinery Dealers' Association's programme for the meeting at Norfolk, Va., May 13 to 15, provides for routine business at Monday morning's session. In the afternoon an executive session will be held, at which the following topics will be discussed: "Retroactive Guarantees"; "Discount Sheets and Special Price Circular Letter Quotations"; "Yearly Contracts with Consumers" (opened by M. B. Barkley, Cameron & Barkley Company, Charleston, S. C.); "Right of Dealer to Ship out of His Restricted Territory on Order of Purchasing Agent Located in His Agreed Territory Limits." Question box will follow.

On Tuesday morning the association will meet in joint executive session with the National Supply and Machinery Dealers' Association and the American Supply and Machinery Manufacturers' Association. Addresses will be made on "The National Banking and Currency Problem," by John Perrin, Indianapolis, Ind., member National Monetary Commission, and James A. Fulton, McKeesport, Pa., secretary American Monetary League, followed by discussions of matters of common interest to the three associations.

In the afternoon an executive session will be held, with a discussion on "Special Premium Inducements Made to Jobbers' Salesmen by Manufacturers"; an informal address on "Association Work," by John Donnan, secretary-treasurer Southern Hardware Jobbers' Association, Richmond, Va.; discussions on "Resale Prices" and "Whole-Hearted Support of Manufacturers by Jobbers and Vice Versa."

On Wednesday morning at an executive session the convention will finish its business and elect officers. In the afternoon a joint meeting will be held of the three new executive committees.

The comfort and enjoyment of the members and their ladies will be arranged for by a local Entertainment Committee of which John D. Westbrook, Norfolk, is chairman.

The Spicer Tabulating Machine Company, Washington, D. C., has been incorporated with $200,000 capital stock to develop and market a line of machines designed by Charles W. Spicer for statistical and cost accounting work. The machines are a modification of the mechanical appliances used in compiling the last census and now in use by the Canadian government, adapted to commercial purposes. The company does not contemplate establishing a manufacturing plant at this time, but will have its product manufactured by contract. The officers of the company are J. E. Hutchinson, Jr., president; Charles W. Spicer, an engineer, vice-president, and E. Edmonston, Jr., secretary-treasurer.

The Production of Steel Ingots in 1911

We are indebted to James M. Swank, general manager of the American Iron and Steel Association, Philadelphia, Pa., for an advance copy of the Bulletin of the association giving statistics of the production of steel ingots in the United States in 1911, as follows:

Total Production of Steel Ingots and Castings

The production of all kinds of steel ingots and castings in 1911 amounted to 23,675,501 gross tons, against 26,094,919 tons in 1910, a decrease of 2,419,418 tons, or over 9.2 per cent. The production in 1910 was the largest in the country's history. The year of next largest production was 1909. Of the total production in 1911 23,029,479 tons were ingots and 646,022 tons were castings, as compared with 25,154,087 tons of ingots and 940,832 tons of castings in 1910. The following table gives the production of all kinds of steel ingots and castings by processes in the last six years in gross tons.

Years. Gross tons.	Bessemer.	Open hearth.	Crucible and all other.	Total Gross tons.
1911	7,947,849	15,598,650	129,002	23,675,501
1910	9,412,772	16,504,509	177,638	26,094,919
1909	9,330,783	14,493,936	130,302	23,955,021
1908	6,116,755	7,836,729	69,763	14,023,247
1907	11,667,549	11,549,736	145,309	23,362,594
1906	12,275,830	10,980,413	141,893	23,398,136

Bessemer Steel Ingots and Castings

The production of Bessemer steel ingots and castings in 1911 was 7,947,849 tons, against 9,412,772 tons in 1910, a decrease of 1,464,923 tons, or over 15.5 per cent. The production in 1911 was 4,327,981 tons less than in 1906, when the maximum production of 12,275,830 tons was reached. Of the total production in 1911 7,893,961 tons were made by the standard Bessemer process, against 9,355,350 tons in 1910; 26,219 tons by the Tropenas process, against 26,733 tons in 1910; and 27,669 tons by other modifications of the Bessemer process, against 30,689 tons in 1910. The following table gives the production by States of Bessemer steel ingots and castings in the last four years.

States.	1908.	1909.	1910.	1911.
Ohio	1,955,446	3,466,077	3,314,053	3,268,994
Pennsylvania	2,106,382	2,845,602	2,975,750	2,338,813
Illinois	1,237,747	1,632,444	1,693,053	1,335,053
Other States	817,180	1,386,660	1,429,916	1,004,989
Total	6,116,755	9,330,783	9,412,772	7,947,849

The Bessemer steel made in 1911, including both ingots and castings, was produced by 73 works located in 24 States and the District of Columbia. In 1910 71 works in 22 States and the District of Columbia made Bessemer steel.

Twenty-two standard Bessemer plants were at work in 1911, as compared with 25 in 1910, and 27 Tropenas plants were running in 1911, against 24 in 1910. In addition 1 plant made steel by the Robert-Bessemer process in 1911, against 2 plants in 1910, and 23 plants made steel in 1911 by the Bookwalter, Bretaud and other modifications of the Bessemer process, against 20 in 1910.

The following table gives separately by States, the production of Bessemer steel ingots and castings in 1911, all made by the acid process. With the exception of 8 tons all the ingots produced in 1911 were made by the standard Bessemer process. Of the total production of steel castings in 1911, 3216 tons were made by the standard process, 26,211 tons by the Tropenas process, and 27,669 tons by the Bookwalter and other modifications of the Bessemer process.

States—Gross tons.	Ingots.	Castings.	Total.
Ohio	3,259,936	9,058	3,268,994
Pennsylvania	2,330,715	8,098	2,338,813
Illinois	1,327,072	7,981	1,335,053
Other States	973,030	31,959	1,004,989
Total for 1911	7,890,753	57,096	7,947,849
Total for 1910	9,354,437	58,335	9,412,772
Total for 1909	9,296,969	33,814	9,330,783
Total for 1908	6,096,196	20,559	6,116,755
Total for 1907	11,634,276	33,273	11,667,549
Total for 1906	12,243,229	32,601	12,275,830

Open Hearth Steel Ingots and Castings

The total production of open-hearth steel ingots and direct castings in 1911 was 15,598,650 gross tons, against 16,504,599 tons in 1910, a decrease of 905,859 tons, or over 5.4 per cent. The production in 1910 was much the largest in our history. In 1911 the production of open-hearth steel exceeded that of Bessemer steel by 7,650,801 tons. In 1908 the production of open-hearth steel for the first time exceeded that of Bessemer steel, the difference amounting to 1,719,974 tons; in 1909 the difference in favor of open-hearth steel was 5,163,153 tons; and in 1910 it was 7,091,737 tons. Of the total production of open-hearth steel in 1911 15,027,459 tons were ingots and 571,191 tons were castings, as compared with 15,641,158 tons of ingots and 853,351 tons of castings in 1910 and 13,892,896 tons of ingots and 601,040 tons of castings in 1909. The following table gives the production of open-hearth steel ingots and castings by States since 1908 in gross tons.

States	1908.	1909.	1910.	1911.
New England	158,417	257,392	223,158	189,879
N. Y. and N. J.	350,348	618,117	713,245	679,152
Pennsylvania	5,322,229	9,400,287	10,153,816	9,594,914
Ohio	525,171	1,424,452	1,733,409	1,721,549
Indiana	167,299	783,957	1,307,129	1,394,520
Illinois	483,104	1,052,572	995,011	801,624
Other States	830,161	957,159	1,378,741	1,217,012
Total	7,836,729	14,493,936	16,504,509	15,598,650

The open-hearth steel ingots and castings made in 1911 were produced by 149 works in 23 States and the District of Columbia, as compared with 147 works in 23 States and the District of Columbia in 1910. In 1911 there were 28 idle open-hearth steel plants, as compared with the same number in 1910.

Of the total production of basic open-hearth steel in 1911 14,419,306 tons were ingots and 266,626 tons were castings, while of the total production of acid open-hearth steel in the same year 608,153 tons were ingots and 304,565 tons were castings. The following table gives the production by States of both basic and acid open-hearth steel ingots and castings in 1911.

States—Gross tons.	Basic open-hearth steel.	Acid open-hearth steel.	Total Gross tons.
New England	155,488	34,391	189,879
N. Y. and N. J.	630,421	48,731	679,152
Pennsylvania	8,913,868	681,046	9,594,914
Ohio	1,670,481	51,068	1,721,549
Indiana	1,371,614	22,906	1,394,520
Illinois	767,383	34,241	801,624
Other States	1,176,677	40,335	1,217,012
Total for 1911	14,685,932	912,718	15,598,650
Total for 1910	15,292,329	1,212,180	16,504,509
Total for 1909	13,417,472	1,076,464	14,493,936
Total for 1908	7,140,425	696,304	7,836,729
Total for 1907	10,279,315	1,270,421	11,549,736
Total for 1906	9,658,760	1,321,653	10,980,413

In 1911 there were 14,685,932 tons of open-hearth steel made by the basic process and 912,718 tons by the acid process, while in 1910 the production by the basic process amounted to 15,292,329 tons and by the acid process to 1,212,180 tons. This is a loss in 1911 by the basic process of 606,397 tons and by the acid process of 299,462 tons.

Of the active works in 1911 71 made acid open-hearth steel ingots or castings and 98 made basic steel ingots or castings. A number of the works made basic steel only, some acid steel only, and others both basic and acid steel. The following table gives separately the production by States of open-hearth steel ingots and castings in 1911. The decrease in the production of ingots in 1911 as compared with 1910 amounted to 613,699 tons and the decrease in the production of castings to 292,160 tons.

States.	Ingots.	Castings.	Total.
New Eng., N. Y., and N. J.	805,940	63,091	869,031
Pennsylvania	9,350,611	244,303	9,594,914
Ohio	1,641,129	80,420	1,721,549
Indiana	1,371,285	23,235	1,394,520
Illinois	725,897	75,727	801,624
Other States	1,132,597	84,415	1,217,012
Total for 1911	15,027,459	571,191	15,598,650
Total for 1910	15,641,158	863,351	16,504,509
Total for 1909	13,892,896	601,040	14,493,936
Total for 1908	7,524,952	311,777	7,836,729
Total for 1907	10,803,211	746,525	11,549,736
Total for 1906	10,260,522	719,891	10,980,413

Crucible Steel Ingots and Castings

The production of crucible steel in 1911 amounted to 97,653 tons, against 122,303 tons in 1910, a decrease of 24,650 tons, or over 20.1 per cent. The maximum production was reached in 1907, when 131,234 tons were made. The following table gives separately by States the production of crucible steel ingots and castings in 1911.

States—Gross tons.	Ingots.	Castings.	Total.
Pennsylvania	51,372	1,360	52,732
Other States	32,251	12,670	44,921
Total for 1911	83,623	14,030	97,653
Total for 1910	107,671	14,632	122,303
Total for 1909	94,672	12,683	107,355
Total for 1908	55,360	8,271	63,631
Total for 1907	121,001	10,233	131,234
Total for 1906	117,170	10,343	127,513

Electric Steel Ingots and Castings

The production of steel by the electric process in 1911 amounted to 29,105 gross tons, against 52,141 tons in 1910 and 13,762 tons in 1909. Of the total in 1911 about 27,227 tons were ingots and about 1878 tons were castings, while in 1910 about 50,821 tons were ingots and 1320 tons were castings and in 1909 about 13,456 tons were ingots and about 306 tons were castings. In 1911 there were 9 active electric plants, as follows: Massachusetts, 1; New York, 3; Pennsylvania, 3; Indiana, 1, and Illinois, 1.

Miscellaneous Steel Ingots and Castings

The production of steel in 1911 by various minor processes amounted to 2244 tons, against 3194 tons in 1910. In 1909 the production amounted to 9185 tons, in 1908 to 6132 tons, in 1907 to 14,075 tons, and in 1906 to 14,380 tons. Of the production in 1911 417 tons were ingots and 1827 tons were castings.

The following table gives the production of all kinds of steel ingots and castings since 1906.

Years—Gross tons.	Ingots.	Castings.	Total.
1911	23,029,479	646,022	23,675,501
1910	25,154,087	940,832	26,094,919
1909	23,298,779	656,242	23,955,021
1908	13,677,027	346,220	14,023,247
1907	22,559,477	803,117	23,362,594
1906	22,624,431	773,705	23,398,136

The Sphere of the Premium Plan

BY F. G. COBURN

The respective merits of the piece-rate and premium plans of payment for labor look different, naturally, from different points of view. The piece-worker, for example, will look askance at the proposition of taking up a payment method that would cut his piece rate on excessive output; the day-wage worker of skill and industrious habits would look on either as a chance to fatten his roll; the premium worker might prefer a definite rather than an indefinite offer for his services.

Method of Payment a Part of the Scheme of Management

It is well to say at first that the method of payment for labor is but a part of the general scheme of management, and the scheme of management is only the tool of the manager, the same principles applying to the manager as to the workman in selecting a tool to do something. The selection of the details of payment for labor, or the scheme of management, does not in itself accomplish the result aimed at—successful management.

Perhaps for the same general reasons that in buying or selling it is generally better to know the price in advance, the piece-rate method of paying for labor is the best. Certainly the day wage and piece-rate plans are the oldest and most generally used; and those who are using the piece-rate method, as a rule, do not look with favor on changing from it.

A primal requirement for successful operation of the piece-rate system is that the rate must be satisfactory to all hands concerned. This requirement applies to the conditions of any sale. And if the price is right the other details usually settle themselves. The management approaching the problem of changing from the straight time, or day wage, plan of payment is first confronted by this question of price; and it is from this point of view that the premium plan may look good.

Extending the Piece-Work System

The writer was for some years connected with an establishment engaged in the production of quite varied classes of work, where both piece-rate and straight-time methods were in use. The problem of extending piecework into new departments was solved by the adoption of the premium plan as a temporary measure, most satisfactorily. It is probable that this is the real sphere of the premium plan of payment.

Piece rates had been in use for some years, with satisfaction to all concerned, and quite extensively, too, the rate schedule being a sizable book. The rates, with a few exceptions, were all on duplicating or repetition work, and it was not an inherently difficult matter to determine rates, after careful investigation in each case, satisfactorily both to the buyer and the seller. And no rate had ever been cut unless on account of a change in material or process, and then only when the change was satisfactory to both parties. This, by the way, illustrates the point that the system is only a tool.

In the department to which the piece-rate plan was to be extended the output consisted of goods of various make-ups, each the result of a number of different operations by each worker, involving both skill and thought—or, I might say, skill of thought and manipulation. Past performances, the foreman's guesses ("judgment and experience") nor the stop-watch—none of these methods, commonly in use to set rates—would insure determination of prices satisfactory to all hands.

If the ordinary method of allowing the foreman as a rate-setter to name prices more or less arbitrarily had been adopted all the faults of the piece-rate plan as ordinarily practiced would have been experienced, and chief among these may be mentioned the one which evinces itself in limitation of output by the worker or rate cutting by the management, or both.

Nor could the premium plan, as ordinarily understood, be successfully used. By this I mean setting standard times on the basis of past performances, and "whacking up" on savings and mistakes. Past performances are as unreliable as criteria of future performances in the shop as they are in certain other places.

How the Rate Was Established

The management set about determining what the times ought to be by stop-watch time study, general observation, and further by study of past performances. Of course, the time as it ought to be could not be definitely predetermined with justice either to the worker or the management. But it could be fairly closely determined, and when set and adopted resulted in the worker increasing his pay, in the lowering of costs and in allowing the different workers to earn according to their respective abilities.

There was no real opposition to the adoption of the plan, because the workers were convinced of the management's good faith, shown by adherence to prices in the past. So one by one they accepted work under the new plan (it was not forced on them), and soon the management's difficulty lay in establishing enough schedules to give all hands premium work.

The plan has been in operation for more than a year, and before long accurate and reliable data will be available, produced by the operation of this method, on which equitable piece rates may be set and the aim of the management will have been accomplished.

In the meantime other departments, operating on the day wage plan, have demanded premium work. This is the result of the influence of seeing that rates and times are adhered to, that day workers are not forced up to the standard of piece workers and premium workers, that in the change the workers are protected to the amount of their daily wage, that pay envelopes can be fattened, and that all hands stand on their own respective merits. And the management is now extending the premium plan to two of these departments, as the result of several years' preparation.

I believe that this sphere of usefulness for the premium plan has not been very generally recognized, and that when it is, it will be thought of more highly, and the piecework plan will come more generally into successful use.

Double Draw Presses

Economies Made Possible by a Line Recently Developed by the E. W. Bliss Company

The latest development in improved means for producing cupped articles or shells by the drawing process is the double draw press. These presses as built by the E. W. Bliss Company, 11 Adams street, Brooklyn, N. Y., differ mechanically from the ordinary double-action press in having three moving slides instead of two and it is therefore entirely correct to speak of them as triple-action presses. The primary object sought in the double draw press is to increase production or save time while reducing cost in manufacture by making two drawing operations on a single article with one stroke of the press to draw and re-draw or make two re-draws in a single operation. The special field for which this type is particularly intended is the making of articles which require more than one drawing operation to bring them to the required dimensions and as a large percentage of drawn work is in this class the field is large. The line of presses built numbers six in all and range in drawing capacity for receiving blanks of from 1X to 1/16-in. steel up to 25 in. in diameter and producing shells up to 10 in. deep. The construction of the smaller sizes differs somewhat from that of the larger presses, the former being adapted to permit the use of dies with cutting edges. In this way it is possible to cut blanks, draw and re-draw in one stroke, but in the larger sizes handling blanks larger than 12 in. in diameter dies with cutting edges cannot be employed. Two of these new presses are illustrated herewith. Fig. 1 shows a machine used for cutting blanks up to 12 in. in diameter from brass sheets or strips up to No. 22 gauge, while the capacity of the machine illustrated in Fig. 2 is blanks 21 in. in diameter and No. 20 gauge. Specimens of shells produced in one operation from flat blanks by these presses are shown in Fig 3.

In the press, a view of which is given in Fig. 1, it is possible to cut blanks having a maximum diameter of 12 in. from sheets or strips not heavier than No. 22 gauge and perform two draws on them. In the line of presses of which this forms a part the slide movements are made to operate the dies in this way. A double die with the blank on its top is brought in contact with a blank holder, a tubular punch then descends into the top section of the die and makes the first draw. This punch stops and by dwelling acts as a blank holder during the second draw which is performed by a punch which descends through the tubular one into the lower section of the die, beginning the second draw immediately after the first is completed. In the machine illustrated in Fig. 1 the die bed is fixed and rigid and a blank holder carrying the top cutting edges has motion in very long adjustable guides. As far as possible the moving parts are balanced and are started and stopped by a combined toggle friction clutch and brake, either automatically or by hand. The blank holder is actuated by toggles receiving motion from a cam which produces a dwell during the drawing period and receives the blank holder pressure, thus relieving the cam from pressure during that time. The first slide is actuated by a crank and toggle motion and the second draw punch by a simple crank motion.

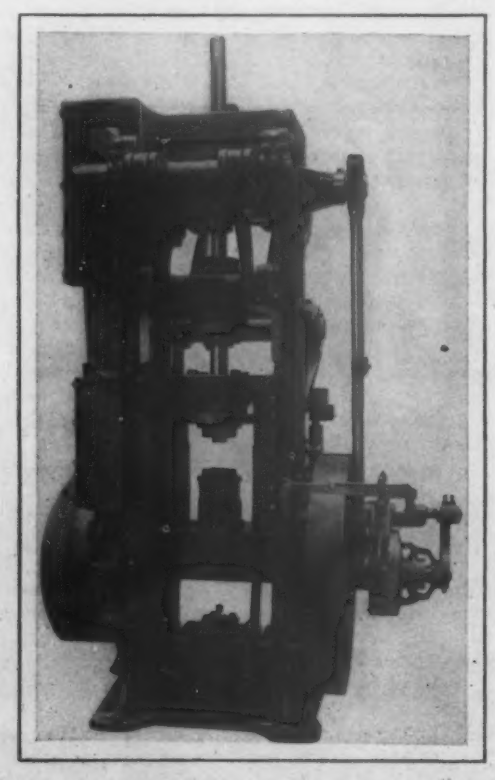


Fig. 1—A New Double Draw Press Developed by the E. W. Bliss Company, Brooklyn, N. Y.

Fig. 2—Another Press Capable of Handling 21-In. Blanks of No. 20 Gauge Steel

The other machine, a view of which is given in Fig. 2, is heavier than the other one. It will receive first draw punches up to a maximum diameter of 14 in and will produce shells having a final depth of 8 in. from 21-in. blanks of No. 20 gauge steel. The lower dies in this machine are fastened to a table having motion and are brought up against a stationary blank holder which is adjustable. Toggles actuated by a large cam groove in the main gear move the table up and down and take all the pressure due to the blank holder and the descent of the punches. In this way the cam is relieved of all duty except that of moving the table up and down and, since this part is counterbalanced, its work is light and there is practically no wear.

The second draw punch slide controls the movements of the first draw punch slide through toggles which provide a fine dwell for the first draw punch during the drawing period of the second. All the moving parts are counterbalanced during their motion by a hydraulic plunger and accumulator system shown at the right of the engraving. In this way the starting of the press is rendered easy, certain and safe and the accumulator can be placed in the most convenient location either nearby or at a considerable distance from the press and above or below the floor line as may be desired.

The press is driven and controlled by a powerful combined friction clutch and brake fitted with both hand and automatic control, although the larger presses have hand control only. Both draw punches and the stationary blank holder have convenient adjustments.

The performance of these machines in a number of manufacturing establishments where they have been placed is said to have demonstrated their advantages very satisfactorily. The economies effected by this new type of drawing, it is emphasized, are not alone due to simplicity and rapidity of mechanical production, but also to a reduction in the handling of the shells and a smaller space occupied by the machinery and the partially finished products. Another further advantage of this class of drawing presses is that the annealing of shells between operations is dis-

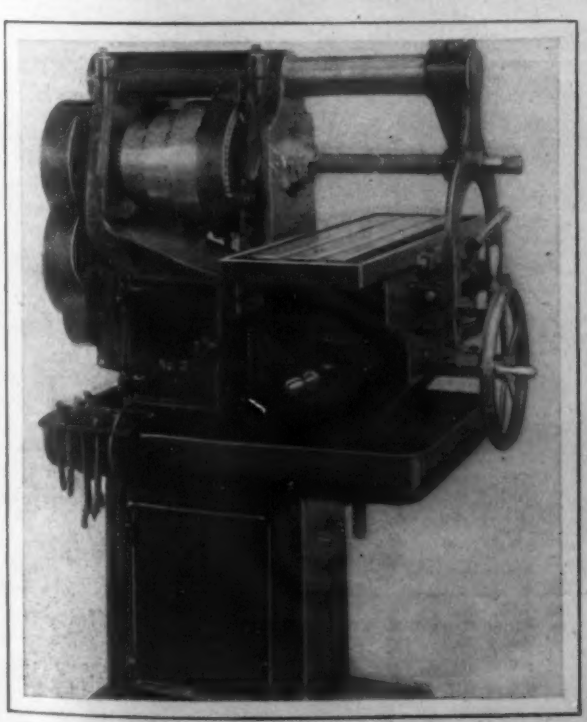
pensed with. Where work of this character is done in a single-draw press the shells have to be annealed between the operations, but where one drawing operation immediately succeeds the other, as is the case with the double-draw press, the necessity for annealing is avoided while the heat generated in the first drawing remains in the shell. The economy incident to this change in operation is important since the annealing involves expense in the maintenance of furnaces, the handling and cleaning of annealed shells, etc.

Fig. 3—Specimens of Shells Produced in One Operation from Flat Blanks by the Bliss Double Draw Presses

An Improved Plain Miller

For use in plain manufacturing operations where a rigid machine built to withstand vibration is more desirable than one possessing all of the movements of the universal milling machine, the Bickford Machine Company, Greenfield, Mass., has designed and brought out an improved type of plain miller. In the construction of the machine several new features have been embodied among which are a rigid table bearing, a special device for controlling the movement of the knee and the table and a rigid overhanging arm.

The table which has two slots for T bolts and the saddles are cast solid to give a very rigid table bearing 24 in. long and 8 in. wide. The over-all dimensions of the table are 10¾ by 34 in., and there is a deep oil channel extending around the platen which measures 7¼ by 29½ in. The table feed is of the rack and pinion type employing a 6 pitch rack 1⅜ in. wide and of any desired length. A special clutch and gear device inside the knee connects the hand wheel at the side of the machine so that it will operate the knee up and down or the table in either direction as may be desired, the engagement of the different movements being controlled by a simple movement of the lever at the front of and below the table to either the right or left. The crucible steel spindle runs in phosphor bronze bearings, the front one being bored with a taper hole in which the spindle is secured against end motion by a special clamp collar. This bearing can be carried ¾ in. through the main housing to which it is splined and is held by a nut at either end. A graduated collar having a clamp screw to set it back to zero from any position is also carried on the front end. The feed is obtained by employing a coarse pitch worm meshing with a very large gear on the pinion shaft, a ball thrust bearing taking the end pressure of the worm. This feed shaft is driven entirely by gears, and any one of the ten changes which are available for each of the three spindle speeds are secured by opening a door in the front of the machine and shifting a lever. The overhanging arm is of steel 3¼ in. in diameter, and the drop arm and braces are cast solid with it, thus giving a rigid construction. The levers which operate the power feed and stops are conveniently located.



The No. 2 Plain Milling Machine Recently Brought Out by the Bickford Machine Company, Greenfield, Mass.

The spindle is driven by a pulley which runs freely upon it and carries a small gear, which drives the back shaft. The gear in turn drives the main gear on the spindle, the power ratio being 6 to 1. Three spindle speeds are available and are secured by the use of a three-step cone pulley, the diameters of the different steps being 7½, 9 and 10½ in. This pulley is held in position by a spring collar between one end and the main driving gear which travels longitudinally with the spindle. The power is transmitted by a 2½-in. belt.

A large oil pan is provided with loose splashers which are not shown to carry all surplus lubricant to a tank in the base from where it is taken by a gear pump on the rear of the machine. Three sizes in all of machine are built, and the No. 2, or middle size, which is the one illustrated, weighs 1700 lb.

A Carbuilding Plant for Port Arthur

A group of Canadian financiers and manufacturers, headed by F. B. McCurdy, J. R. McLeod and F. M. Brown, has concluded arrangements with the city of Port Arthur, Canada, for the erection of a modern steel and wood carbuilding plant. The company will be known as the Ontario & Western Car Company and will have a capitalization of $5,000,000. These people are the organizers of the Nova Scotia Car Works, Ltd., which is operating successfully in the city of Halifax. As the plant will be located at the head of navigation and the center of Canada, it will be in a position to supply freight and passenger cars to the various transcontinental railroads at the point where they are most needed. It should also, owing to the geographical location, be able to assemble materials more cheaply and therefore build cars at a lower cost than any other plant in Canada. A great deal of credit is due to the industrial commissioner of the city, N. G. Neill, as he has been the means of promoting this enterprise and interesting Eastern capital.

Edgar Allen & Co., Ltd., have removed to 718-722 West Lake street, Chicago, where they will carry a full stock of all grades of their high class tool steels manufactured in their Imperial Steel Works, Sheffield, England.

Heavy Forgings Lathe

Interesting Details of a Recent Product of the Lodge & Shipley Machine Tool Company

For taking exceptional heavy cuts and rapidly reducing the diameter of shafting and forgings by rough turning, the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, has recently designed a new type of motor-driven lathe. One of the special features of the lathe is an arrangement of spindle speeds so that the speeds obtainable will suit only those diameters that can swing over the carriage. The regular spindle speeds provide for turning at a rate not to exceed 140 ft. per minute on 3-in. diameters and not less than 61 ft. per minute on 15-in. stock. The actual swing over the carriage is 15 in. and that over the bed is 30½ in. A front view of the lathe is given in Fig. 1, while the rear of the apron showing the large gears used and the central oiling station is illustrated in Fig. 2.

The headstock of the lathe illustrated is designed to receive a 30-hp. direct-current adjustable-speed motor having a range of from 400 to 1200 r.p.m., but any type of motor can be employed and if desired it can have any horsepower up to 40. There are two gear ratios which with a motor speed range of from 3 to 1 provide spindle speeds of from 15.6 to 173 r.p.m. If desired any ratio of gearing can be supplied to accommodate motors of higher speed or to give the driving spindle any slower speed that may be required, this reduction, of course, increasing the ratio of the gears. All the driving gears in the headstock are of hardened and heat treated steel and the lightest gear has a diamecal pitch of 4. The spindle is solid and is journaled in standard composition metal replaceable bearings. It runs against a solid hardened steel plug at the rear end to resist the end thrust. The diameter of the front spindle bearing is large and the projected area is 60 sq. in. The back spindle bearing is also large in diameter and has a projected area of 47 sq. in. All the other journals in the headstock have bronze bushings.

The lathe has a compensating face plate drive, and the face plate which is of steel is 22 in. in diameter. The dogs which act as drivers are also of steel and can be adjusted radially on the face plate to accommodate driving dogs of various capacities and lengths. The driving shaft within the headstock is supported on both sides of the gears and thus all overhang is eliminated. All of the driving gears and the journals including the main spindle bearings and the thrust bearing at the back of the spindle have forced lubrication by pumped oil circulation. The oil drains from the headstock bearings and gearing to a reservoir cast in the bed underneath the headstock and is kept from this reservoir by a positively-driven spiral geared pump to a reservoir at the top of the head from which it is piped to the various bearings and gears. The centers are No. 6 Morse taper, and the one in the headstock is fitted into a hardened steel bushing forced into the spindle. The overall length of the headstock is 48 in., and all the driving gearing is entirely inclosed by gear covers. With a 30-hp. motor the lathe will deliver a pull of approximately 19,500 lb. at an 8-in. shaft diameter and about 25,000 lb. with a 30 per cent. overload on the motor. The pressure created by this pull would ordinarily be about 400 lb. per square inch on the spindle bearings, but it is pointed out that the driving pinion is so placed that the pressure of the cut is opposed by the driving pinion itself and consequently the amount of pressure per square inch is greatly reduced.

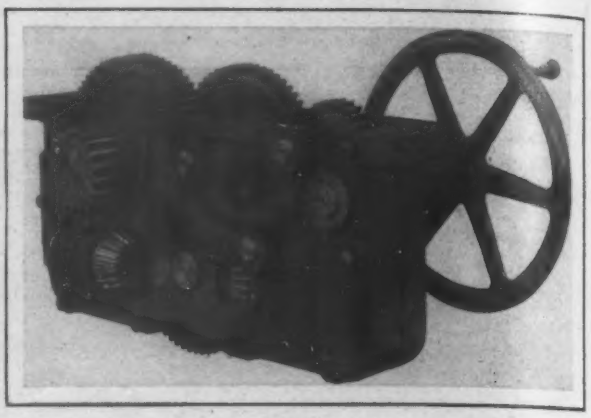


Fig. 2—Back View of the Apron, Showing the Large Gears Used and the Central Oiling Station

The tailstock arbor which is of tool steel is of large diameter and is reamed for a No. 6 Morse taper. The tailstock has a long bearing on the bed and a locking pawl engages a rack cast inside of the bed. The screw for adjusting the tailstock arbor is of large diameter and the total bearing surface of the tailstock on the bed is 120 sq. in.

The rack pinion in the apron is exceptionally large in diameter with a wide face and is made of high carbon steel. A view of the back of the apron showing the large gears used and the central oiling station is given in Fig. 2. The smallest gear in the apron has a diameter of 3½ in. and the finest diametral pitch is 5. The smallest face width of any gear in the apron is 1½ in. Steel is employed for all the gears and the bearings are bronze bushed. To insure close inspection of the friction faces at all times the friction for locking the feed is placed on the outside of the apron. The double wall type of construction is employed which gives support for both ends of all bearings. The hand wheel is 18 in. in diameter, and the arrangement of the gears is such that one complete turn moves the carriage about ⅞ in.

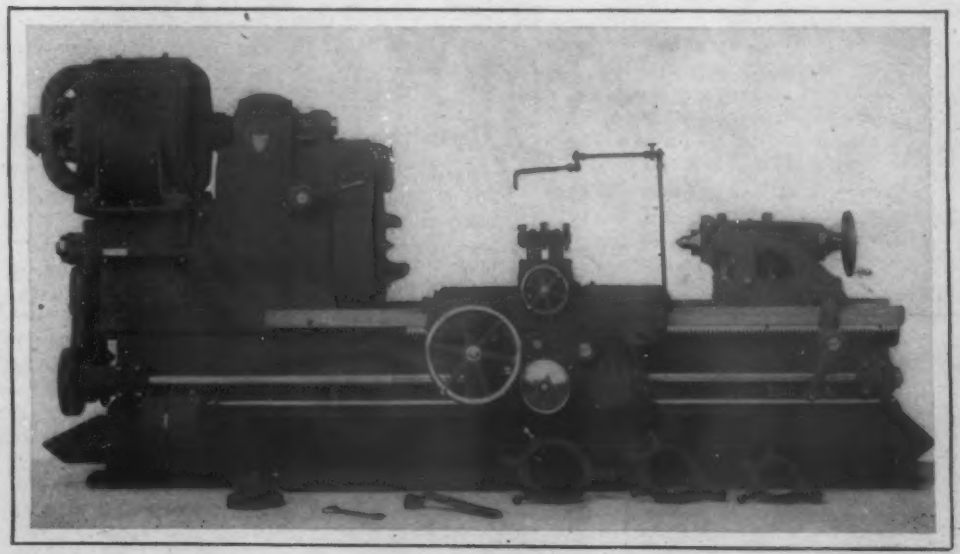


Fig. 1—View of a New Motor-Driven Lathe for Rough Turning Heavy Forgings and Shafting Built by the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio

The carriage is very long and thick and bears throughout its entire length upon the bed, the total area of the surfaces bearing on the bed being 245 sq. in. It is gibbed both front and rear and also under the inside V's. The bridge is wide and strong, and the dovetail is inverted. The tool block, which is of steel, rests on a cast-iron cross slide, and there is one center slot which will accommodate tools measuring ¼ by 2½ in. in section and two open sides for tools of the same dimensions. To give the tool a long bearing serrated and hardened tool steel plates are secured to the tool block. The carriage is very long and the area of bearing surface on the top of the carriage measures 168 sq. in. The cross feed screw is of large diameter and is placed as high as possible to resist the action of the cut. An oil trough which is placed below the inverted

dove tail so that the lubricant from the cutting tool will not flood the sliding surfaces is cast entirely around the carriage. The carriage drains at the four low corners at its ends back into the drip pan under the bed. The hand wheel of the cross feed screw is 9 in. in diameter and has two handles. A separate pump is provided for the cutting compound in addition to the one employed for the lubricating system. The pump which handles the cutting compound is geared positively from the headstock and will deliver a ¾-in. stream of lubricant to the cutting tool at the rate of 16 gal. per minute. Instead of the flexible tubing which is ordinarily employed, the tubing used is of the telescopic variety with the necessary stuffing boxes to take care of the longitudinal travel of the carriage.

The bed is exceptionally wide at the top and is very deep. It is mounted on cabinet legs and has a heavy steel oil pan extending its entire length. The lubricant drains directly into the lower cast iron pan and is pumped from there to the cutting tool. In this way the chips are separated from the lubricant and the chip pan itself is always comparatively dry.

The front carriage V is very wide. The large diameter feed rod has key seats diametrically opposite for driving a steel bevel gear in the apron. The rod is driven by plain change gears, and four feed changes are provided ranging from 1 to 3/16 in. per revolution of the spindle. All of these gears have wide faces and are of coarse pitch. The controller rod extends along the bed and is operated by a handle near the top of the carriage.

In tests this lathe has reduced a 0.45 per cent. carbon steel axle 1½ in. in diameter with a feed of 9/64 in. per revolution at a surface speed of 63 ft. per minute.

A Nine-Spindle Milling Machine

A recent addition to the line of multiple-spindle milling machines built by the Beaman & Smith Company, Providence, R. I., is a nine-spindle miller. This machine will finish at one setting the three sides of as many T-head automobile cylinder castings as the table will accommodate. In this way the production is greatly increased and a uniformity which is said to be impossible when each casting is machined separately is secured.

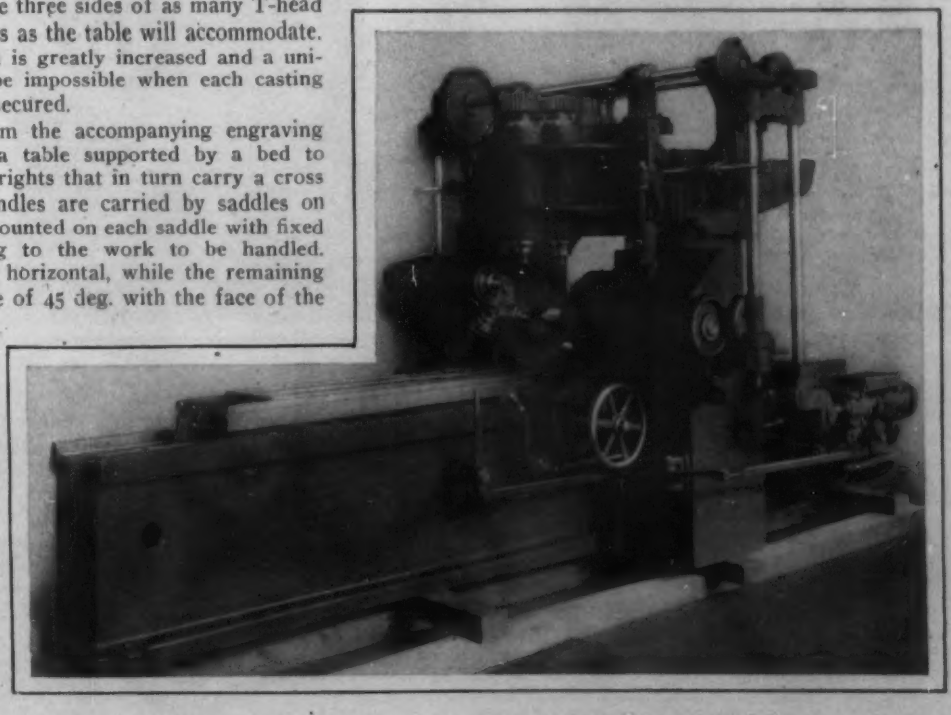
As will be noticed from the accompanying engraving the machine consists of a table supported by a bed to which are attached two uprights that in turn carry a cross rail. Six of the nine spindles are carried by saddles on the uprights, three being mounted on each saddle with fixed center distances according to the work to be handled. Five of these spindles are horizontal, while the remaining one is mounted at an angle of 45 deg. with the face of the table. The three remaining spindles, which are vertical, are supported by a saddle mounted on the cross rail. All of these saddles have vertical and horizontal movements on the uprights and the cross rail respectively. Crucible steel is employed for the spindles, which run in hard bronze boxes. The angular spindle has a 2-in. endwise adjustment, while that for the others is ½ in. less. Any desired type of cutter can be used as the ends of the spindles are finished in accordance with the purchaser's specifications. The entire nine spindles operate in unison at speeds varying from 17 to 69 r.p.m. The front spindle bearings are 3 in. in diameter and 4 in. long, while the rear ones are ½ in. less in diameter and ½ in. longer. All of the bearings have adjustments to compensate for wear.

The table, which has a working surface 17 in. wide and 10 ft. long, has three T-slots finished from the solid. It has a movement of 130 in. on the bed and a quick power movement in either direction of from 3½ to 14½ ft. per minute. The feeds for the table are positive in either direction and are secured through gearing contained in a conveniently located feed box. Nine changes ranging from 1 to 6 in. can be secured at any spindle speed and the change from one rate to another is quickly made. These feeds, it is pointed out, are arranged so as to maintain any desired rate for any of the spindle speeds. The table is operated by a screw in a revolving bronze nut and the thrust is taken by ball bearings. The machine is driven by a 7½-hp. motor at from 400 to 1600 r.p.m. through gearing having a ratio of 23 to 1.

The following table gives the principal dimensions and specifications of the machine:

Distance between uprights, in.	31
Minimum distance between vertical spindles and table, in.	18 1/16
Maximum distance between vertical spindles and table, in.	19 9/16
Minimum distance between horizontal spindles, in.	5 7/16
Maximum distance between horizontal spindles, in.	15¾
Number of feed changes	9
Minimum feed, in.	1
Maximum feed, in.	6
Minimum spindle speed, r.p.m.	17
Maximum spindle speed, r.p.m.	69
Power required, hp	7½
Weight, lb.	20,000

In the construction of the machine bronze-lined boxes are provided for all the rapidly moving shafts. The bearings are finished by grinding and the sliding surfaces are scraped. The majority of the bevel gears used are of steel and all the gears are cut from the solid.



A New Nine-Spindle Miller for Simultaneously Finishing the Sides of Several T-Head Castings Built by the Beaman & Smith Company, Providence, R. I.

Butler Brothers' Chicago Expansion

Butler Brothers, wholesalers of hardware and other merchandise, have arranged for the erection of a new building as an addition to their Chicago quarters, now consisting of two large buildings. The new building is to be completed about January 1, 1913. It will have 14 stories above ground and two basements, with a frontage of 384 ft. on Canal Street and 152 ft. each on Randolph Street and Lake Street. The total floor area will be 952,000 sq. ft., which will give connected floor space in the three buildings of more than 1,550,000 sq. ft., or 36 acres. Their St. Louis house has for several years enjoyed the distinction of doing business in the largest wholesale structure in the world. When the new building referred to is completed, that distinction will pass to the Chicago house. In the new building one and one-half floors, approximately 80,000 sq. ft., will be devoted to samples alone.

The corporate name of the North American Metaline Company, manufacturer of Metaline bearings, West avenue and Third street, Long Island City, N. Y., was changed April 10 to the Metaline Company.

Rod Heating Furnace

Details of a Recently Developed Device for Use in Conjunction With All Automatic Machines

A patent has been recently granted to P. J. Gordon and Ralph T. Prall, general superintendent and general master mechanic, respectively, of the Republic Iron & Steel Company, Youngstown, Ohio, covering a new type of heating furnace for rods. This furnace is intended for use in connection with all automatic machines, such as railroad and boat spike machines, hot pressed nut machines, rivet machines, etc. The original furnace was built about a year ago and at the present time three are in operation at the Republic plant and the erection of others is contemplated. While the furnaces now in operation are for the heating of rods for making railroad spikes in automatic spike machines, it can be adapted with slight changes for sintering flue dust and blast furnaces. Other applications are as a continuous furnace for general rolling mill purposes, open-hearth and glass furnaces and for roasting ores which have been reduced to a powder. Fig. 1 is an exterior view of the furnace, while details of its construction are given in Fig. 2.

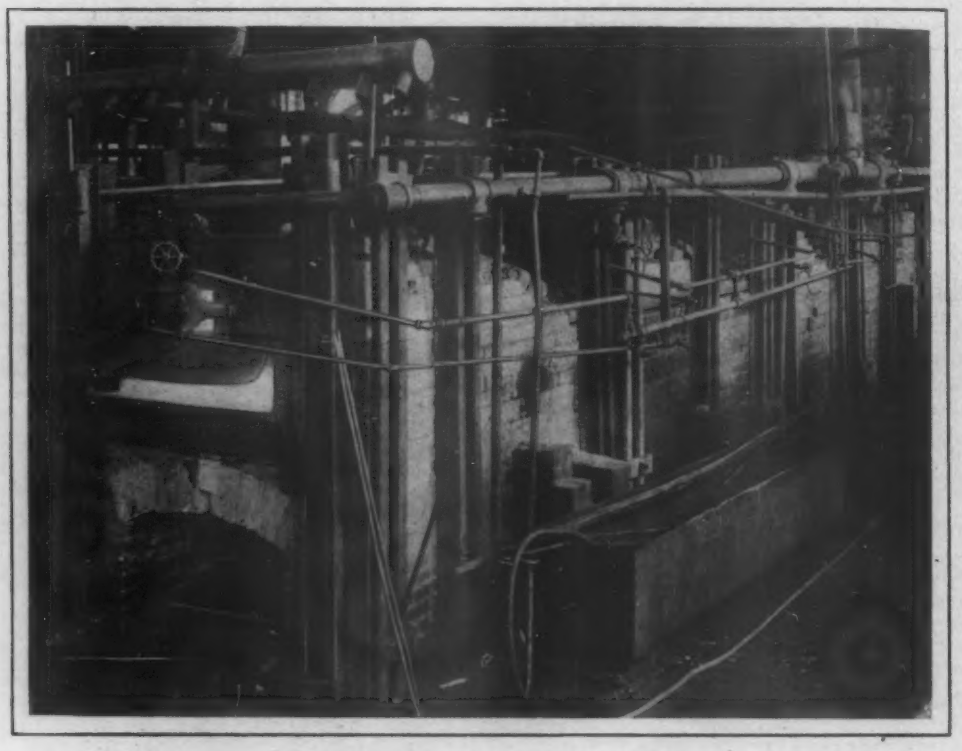


Fig. 1—The Gordon-Prall Continuous Oil Heating Furnace for Rods

The furnace which is shown in the accompanying engraving and drawing is intended for heating 30-ft. rods 5/8 and 9/16 in. square for making railroad spikes in automatic spike machines. Fuel oil is used, although the furnace is equally well adapted for either fuel oil or gas.

With this type of furnace having the burners *a*, Fig. 2, distributed along the roof and the gases of combustion impinging against the sloping portions of the roof and traveling longitudinally along the furnace instead of across it, as was formerly the custom in furnaces for heating long rods of this description, it is pointed out that the gases of combustion have a whirling motion imparted to them to give complete combustion and a uniform heat throughout the furnace. It is emphasized that this uniform heating has made it possible to secure a large increase in the percentage of first quality spikes obtained from the furnace, while the amount of fuel consumed is decreased approximately 20 per cent. In this way it is possible to do with four burners the same amount of work that six were previously required to handle and at the same time the life of the furnace is said to have been greatly increased, a bottom lasting four to five times as long in a furnace of this type as in a side burner furnace where the bottom cuts out rapidly under each of the burners.

In the use of this furnace for the continuous heating of rods of any length from coils for the manufacture of spikes, rivets, hot pressed nuts, bolts, etc., the rod from the coil *b* is passed through three pinch rollers *c* at the back of the furnace which straighten it and feed the stock through the furnace at the same rate at which it is consumed by the spike machine *d* at the right. This furnace is employed in the manufacture of small spikes which are made from 3/8 and 1/2-in. square material, which is delivered at the furnace in coils approximately 24 in. in diameter, each of which contains from 200 to 250 ft. of rod. It has been found that a furnace about 30 ft. long and only 9 in. wide would heat this rod as it is fed through the furnace at a speed sufficient to supply an automatic machine having a capacity of 70 spikes per minute. This gives a furnace output of 29 ft. of rod per minute, as each spike requires 5 in. of rod.

On account of the small cross section of the furnace, which is only 9 1/2 in. in width, 12 in. high at the burners and 7 in. lower where the roof approaches nearest to the hearth, its appearance when fired up is that of an incandescent tube and the amount of fuel consumed is reduced to a minimum. It is pointed out that the output of an automatic machine fed by a furnace of this kind is a maximum since the length of rod in the coil is only limited by what can be handled, and the loss occasioned by the delay in the feeding of the stock is practically eliminated, together with the scrap loss. With a 30-ft. rod the delay in feeding the material causes the spike machine to make from 5 to 15 idle blows between the time of finishing one rod and the time the feeder inserts the next one and a few inches of both ends of the rod are scrap. Where the stock is taken from a coil 300 ft. in length the amount of scrap from the entire coil is the same as that of the 30-ft. rod and the number of idle blows of the spike machine is reduced 90 per cent.

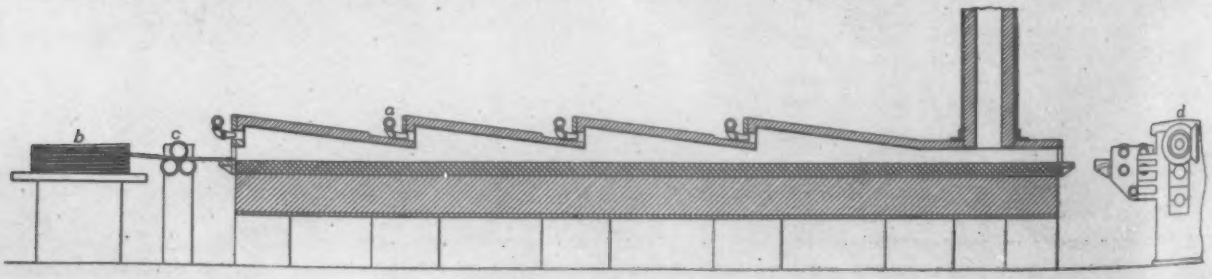


Fig. 2—Scheme of Operation of the Furnace

As has been mentioned, this type of furnace when made slightly wider is adapted for sintering flue dust at blast furnaces. When employed for this purpose the same roof construction is used and the conveyor pans carrying the flue dust pass longitudinally along the hearth. The flue dust to be sintered is delivered to the conveyor pan from the regular bin at the charging end of the furnace and is delivered at the discharge end into a car or other receptacle. Where the furnace is to be used continuously for general rolling mill purposes it is planned to use two or more parallel rows of burners, the width of the furnace and the number of rows of burners depending, of course, upon the size of material to be heated. In the furnaces now in operation at the Republic plant tests have been made with an 85-lb. rail or a 1½-in. square billet and it has been found that either can be heated to a temperature sufficiently high for rolling purposes in 2 minutes. The advantage claimed for this type of furnace when used for open-hearth work is that the roof construction will direct the heat uniformly against the bath throughout the furnace, thus giving a uniform heat to the entire bath and avoiding the difficulty of having the heat follow the roof of the furnace.

A Colossal Reinforced Concrete Bridge

What will be the largest concrete bridge in the world is that to be built by the Delaware, Lackawanna & Western Railroad across Tunkhannock Creek, near Nicholson, Pa. The design calls for a double track structure having ten 180-ft. arches with a 100-ft. arch at each end, and totaling 2,230 ft. in length with a maximum height above water of 249 ft. The principal arches are to be reinforced but they are to be designed to carry loads independently of the reinforcing. The piers are to be carried to solid rock which is about 95 ft. below the ground surface at the deepest point. The centering to be used in placing the large masses of concrete in position is to consist of hinged trussed arches of steel construction, supported by the bridge piers. It was decided to have a ballasted floor construction with a thoroughly waterproof deck and this would have required a heavy design in steel. This fact and the fact that a material increase in live load would produce a less increase in stresses in the case of a concrete structure led, it is stated, to the decision to build of concrete. It was also felt that the maintenance of a steel structure of such height and length was high in view of the liability of the loosening of rivets and deterioration resulting from excessive vibration. The cost of ultimate renewal of a steel structure owing to the conditions of hight and location was estimated to be as great as the first cost.

Announcement is made by the Vitrified Wheel Company, Westfield, Mass., manufacturer of the vitrified line of emery and corundum wheels, of the appointment of H. B. Morrow, 506 Commonwealth Building, Pittsburgh, Pa., as its representative for western Pennsylvania.

The blast furnace of the New York State Steel Company, Buffalo, N. Y., which had been idle for the past eight months, was blown in April 4. The torch was applied by the daughter of Superintendent John P. Quier. The furnace is running very satisfactorily.

New Clamping Devices for the Machine Shop

For shortening the time of securing work to machine tables, Schuchardt & Schütte, West Street Building, New York City, have brought out a new line of clamping devices to which the name S & S has been given. They are calculated to eliminate also the time required for building up clamps from straps and blocks as well as eliminating the slippage which is apt to occur through such practice. The use and value of the clamps is brought out in the accompanying engravings. Fig. 1 is a view of the device employed for side clamping work on machine tables; a combination clamp which can be used for either side or top clamping is illustrated in Figs. 2 and 4, and a universal clamp with a pivoted claw is shown in Fig. 3.

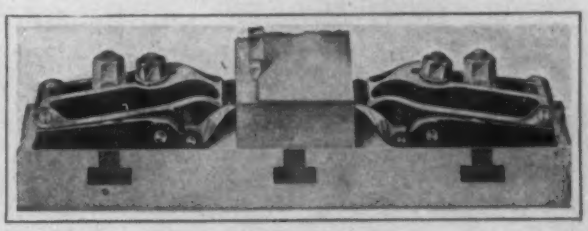


Fig. 1—The S. & S. Device for Sideclamping Work on Machine Tables Made by Schuchardt & Schütte, New York City

The side clamping device, illustrated in Fig. 1, is intended to be used with work that is to be machined on the surface and the work is held by the clamps on the side, as shown. These clamps are said to afford a very powerful uniform grip which holds the work securely and press it down against the base. One of the uses of these clamps, where they will prove especially advantageous is in the production of duplicate work as only a few turns of one nut are required to tighten or release the work and the next piece can be quickly and easily placed in the same position. Five sizes of this clamp are made.

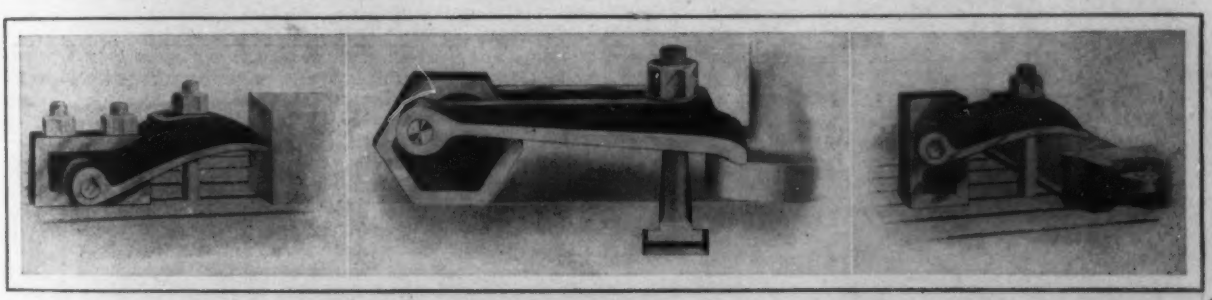


Fig. 2—Side Clamping With a Combination Clamp

Fig. 3—The Universal Clamp With a Pivoted Claw

Fig. 4—The Combination Clamp Employed for Top Clamping

Two Other Styles of Clamps

The combination clamps are available for side clamping, as shown in Fig. 2, or for top clamping, as is brought out in Fig. 4. Four different hights are possible by the use of the square block, and four sizes of this clamp are made.

The universal clamp illustrated in Fig. 3 is designed for work having a flat margin or a flange. The claw of this flange is pivoted on a hexagon block which will supply six different hights as may be desired. Four sizes of clamp having a diameter of hexagon ranging from 3 to 4⅝ in. are made. The T bolts illustrated are not regularly furnished as a part of any of these clamps but can be supplied.

Iron ore cement was discussed recently in a paper before the National Association of Cement Users by P. H. Bates, chemist of the Bureau of Standards. He referred to the extensive deposits of lean ores in which the percentages of iron are too low to admit of economical reduction in blast furnaces, but serve well as a constituent for cement manufacture. The iron ore cements, it appears, must have alumina present or else they are of no value.

The No. 1 blast furnace of the Canada Iron Corporation, Midland, Ontario, is to be relined and given a general overhauling. The contract for this work has been placed with Arthur G. McKee, engineer, Cleveland, Ohio.

T. F. Cole's Additional Stanley Testimony

Value of Ore in the Ground—Utilization of Lean Ores—Ore Reserves on the Old Ranges—The Hill Properties—Need for Railroad Ownership—Cuban and Brazilian Ore Deposits

The examination of Thomas F. Cole before the Stanley Committee, April 12 and 13, was too extended to be fully covered in *The Iron Age* of last week. Additional portions of his testimony are given below:

The Value of Ore In the Ground

MR. YOUNG. Mr. Gardner requested me to ask you whether or not you agreed with Mr. Sellwood's statement when he was on the stand that he thought 40 cents a ton for the fee of the land was enough price for Bessemer ore in the ground under average conditions, and if 50 cents would be about an outside price for ore especially well located.

MR. COLE. As an independent operator I should hesitate to pay out a sum of money equal to 40 or 50 cents a ton in the ground, expecting to mine the iron ore, ship it to market, sell it and make a profit, taking into consideration all of the changes that occur in the steel trade over a period of years.

MR. YOUNG. What do you consider is a fair price for the fee of Bessemer ore under average conditions as it lies on the Mesaba Range?

MR. COLE. I would be willing to undertake to secure the capital and pay a sum equal to 35 cents per gross ton with a view of mining and marketing that ore.

MR. YOUNG. What would you consider a fair royalty?

MR. COLE. I would be willing to pay 65 cents a ton royalty for an exceptionally good deposit of Bessemer ore located under average condition on that range.

MR. BARTLETT. You consider then a difference between buying the fee ore and buying the royalty about that per cent.?

MR. COLE. Yes, provided the ore deposit could be worked out within a term, say, of six or eight years.

MR. YOUNG. In addition to the question of interest, is there not a great advantage in the lease system, as leases are drawn on Lake Superior, because of the right of the lessee to throw up the lease on a few months' notice, so that for instance in a bad year, if he got in a corner, he could escape his liability?

MR. COLE. It is an advantage.

Utilizing Lean Ores

[The ore deposits in the South, in New York State and New Jersey were here discussed to some extent and Edison's concentration experiments were alluded to.]

MR. BARTLETT. Could an arrangement like that be put into operation in mining ores elsewhere?

MR. COLE. I believe, when the necessity arises, that some successful way will be found of concentrating our large reserves of low-grade ores in the Lake country to make them commercially valuable, and so that they can be utilized and produce steel at a reasonable cost. The western Mesaba district has ores of lower grade. The iron ore is intercalated with seams of sand and siliceous material. When it became necessary to take that part of the district and mine the ores and try to get a merchantable product we found a way of concentrating them.

MR. GARDNER. In talking about the availabilities of coking coal in connection with some of these large ore reserves, you spoke about using electricity generated by water power. Is there a future in using that for smelting purposes?

MR. COLE. Electric current is now used for refining steel, and used very successfully. A tremendous advancement has come in that direction in the past few years. I am hopeful that the day may come when they can use electric current for the reduction of iron ores.

MR. GARDNER. You think it is within the bounds of possibility?

MR. COLE. Absolutely so. I should be very slow to say that I do not think it could be used commercially, or be commercially successful.

MR. BARTLETT. As cheaply as the processes which are used now?

MR. COLE. Possibly in time as cheaply as with coke.

Cost of Pig Iron According to Richness of Ore

MR. GARDNER. I have here a statement that each decrease of 1 per cent. in the metallic content of ore raises the cost per ton of producing pig iron 37½ cents, at least, other things being equal. Are you willing to comment upon that statement, to give an opinion?

MR. COLE. I would prefer that some good, intelligent blast furnace man would answer that.

MR. GARDNER. Do you think the American people will ever devise a way by which they can reduce 54 per cent. ore as cheaply as they can reduce 55 per cent. ore? I mean to make pig iron as cheaply out of 54 per cent. ore as they can make pig iron out of 55 per cent. ore?

MR. COLE. I do not believe they can unless they find some way to get rid of a certain amount of the silica in the 54 per cent. material before they put it into the blast furnaces.

MR. GARDNER. I did not realize, perhaps, at the time that Mr. Gayley testified how much of my own opinion as to the steel situation rested on the ore problem, on the exact values as to ores, and certainly if Mr. Gayley were here I should ask him that question. I cannot get an answer to that question, it looks to me, unless you are willing to make a guess.

MR. COLE. I do not want to make a guess.

MR. GARDNER. For instance, we know about what the Geological Survey think we have in the way of 35 per cent. ore, and that is a 20 per cent. reduction of the ores that are being used today in the Superior district. According to this calculation given to me, it would cost today $7.50 more per ton of pig iron to make a ton of pig iron out of 35 per cent. ore than it does to make it out of 55 per cent. ore.

Opinions on Concentration

MR. YOUNG. Let me ask you this: Don't you know that you could concentrate that 35 per cent. ore up to 55 per cent. for a good deal less than $7.50 per ton?

MR. COLE. There is such a very wide margin of profit there that I am sure somebody would do it, but just how it could be done, or that it absolutely can be done, I am unable to tell you today.

MR. YOUNG. Have there not been quite extensive experiments in the concentration made at the Republic, the Champion and the Humboldt a few years ago?

MR. COLE. Concentration is carried on at Michigamme by Mr. Powell and others. An electrical apparatus is installed there. They succeeded in winning the metallic content of the ores, but the amount of tonnage of all the mines was so limited that they did not feel like erecting a large plant.

MR. REED. The concentrator at Coleraine is successful.

MR. COLE. That is a different proposition. It was a proposition of separating siliceous material from a fairly good iron ore. We felt sure from our knowledge of concentrating methods that it could be done successfully. We went ahead and experimented, and we found a way of doing it not only very rapidly but at a very low cost. It is being done successfully now, and has made available a very large tonnage of what was termed low-grade ore on the western Mesaba district.

Difference in Quality of Ore

THE CHAIRMAN. You spoke about exceptionally good ore being worth from 35 to 50 cents per ton in the ground. That would be Bessemer ore?

MR. COLE. Yes.

THE CHAIRMAN. What would you say of non-Bessemer ore?

MR. COLE. The value of non-Bessemer ores and Bessemer ores is coming closer together each year. The volume of steel turned out by the open-hearth process is increasing each year, and as the quantity increases the costs are being lowered, so that the difference in value between Bessemer and non-Bessemer ores is becoming less year after year.

THE CHAIRMAN. What is the difference now?

MR. COLE. Approximately 75 cents per ton of ore.

THE CHAIRMAN. That is per ton of iron ore at the lower Lake ports?

MR. COLE. Yes.

THE CHAIRMAN. I am not speaking of that. I mean iron ore in the ground.

MR. COLE. It is pretty hard to say what differential to place on the two ores in the ground.

THE CHAIRMAN. I want your best judgment

MR. COLE. Well, a difference of 15 cents a ton.

THE CHAIRMAN. Take the Mesaba district all over.

What per cent. would you class as exceptional ore such as you have been talking about?

MR. COLE. Forty per cent.

THE CHAIRMAN. What would you say of the other 60 per cent.? What is it worth in the ground? I mean on up from that which is barely merchantable.

MR. COLE. I should say that 40 per cent. additional was non-Bessemer ore of good quality, and the remaining 20 per cent., of various grades, lower grade Bessemer and also lower grade non-Bessemer ore.

THE CHAIRMAN. What would you put that 20 per cent. at?

MR. COLE. There would be a further difference of 10 cents a ton.

THE CHAIRMAN. The holdings of the Steel Corporation throughout the Mesaba Range are about on a parity with the holdings of the whole range?

MR. COLE. I think the United States Steel Corporation owns the cream on the range. It owns the very best ore produced on the range.

THE CHAIRMAN. How much of the 700,000,000 tons that it owns are in the first class, the highest grade, of Bessemer ore?

MR. COLE. I am unable to give you those figures accurately. I should guess between 50 and 60 per cent.

THE CHAIRMAN. How much of it is of the second class?

MR. COLE. Thirty per cent.

Ore Reserves on Michigan Ranges

THE CHAIRMAN. Take all the Michigan ranges. How do they compare with the Mesaba Range in extent?

MR. COLE. The quantities of ore on these ranges probably are not as large as has been found on the Mesaba, but yet, as exploratory and mining work goes on, I am inclined to the opinion that the total quantities of iron ore found and removed from the various ranges in Michigan will come very close to totaling the total removed from the Mesaba Range.

THE CHAIRMAN. What is the estimated tonnage of those ranges in Michigan now?

MR. REED. The record shows 189,000,000 tons.

MR. COLE. That is the report made by hired officials to authorities of the State to estimate these ore bodies for valuation purposes.

THE CHAIRMAN. It is a mere guess as to whether they will discover any more or not?

MR. COLE. No, I would not say a guess. They have been mining on the Marquette Range 60 years. Many a time I have heard people predicting a gloomy future for the district; that the mines were about all exhausted. The last work I did at the Lake Superior mine, that had operated over 50 years, was to plan work for another 50-year period. The figures given by these officers hired by the State to go there and estimate the ore bodies show today, at the present rate of shipment, 40 years' supply in sight; and I venture to say that when that 40 years has gone they may have more ore in sight then than they have now.

THE CHAIRMAN. When they strike a vertical vein they can only get its width, and they form an approximation of how far down they can afford to mine it, do they not?

MR. COLE. No one can say where the limit of mining commercially ends. On the Gogebic Range, in putting in our mining equipment, we were planning to go to a depth of 3000 ft. No one would say we could not go deeper. While the ore deposits in Michigan are not of as large bodies as the ore in the Mesaba, they may extend to such a great depth that they may produce tonnages equal to the Mesaba.

THE CHAIRMAN. You have a maximum depth to which you can go commercially. Your heat will increase one degree for every 50 ft. after you get down a certain distance.

MR. COLE. In the copper mining district, which is in the same series of rocks—in the Gogebic Range the rocks overlap—they now go to a depth of over 5000 ft., a mile vertically, and they lead down over 8000 from where the vein outcrops on the surface. They are mining successfully. While the heat does increase, it is not at the rate of one degree for every 50 ft., as you say.

THE CHAIRMAN. It is one degree for every 50 ft. vertically; that is my recollection.

MR. COLE. Nearly that, certainly, in the first part of your operations. But when the shafts are opened at different levels and a circulation of air is provided, the temperature is much modified; therefore, I say while we are only mining 1500 and 2000 ft. at the maximum, in the ore deposits of the Lake Superior district I have no reason to doubt that they will mine down to a very great depth.

THE CHAIRMAN. Are you not going on the assumption that, having found one vertical vein succeeding another, one strike after another, in that region, you believe you have not found all the strikes, but you do not know? Is not that the situation?

MR. COLE. That is true; that is the belief, and that is the belief of most eminent men. I suggest you look in this report, which was just handed to me yesterday, and refer to what is said as to the Gogebic district:

> A part of the iron ores of the Gogebic district occur in tabular bodies that lie parallel to the bedding, and a part occurs in great widenings of these bodies at the intersection of the dikes with a footwall quartzite or slate. The line of intersection of the dikes with the footwalls in general dips to the east, although in some places the dip is to the west and in others this line is horizontal. It was formerly supposed that the upper dikes limited the ore bodies below, but it is now known that the ore bodies may be repeated on dike below dike, and to-day no one is willing to predict the depth to which this repetition may be carried.

MR. COLE. Where we have the experience of 25 or 50 years we feel reasonably sure that the knowledge thus gained in years is a pretty good guide to go on. Therefore, we always figure for a considerably greater depth than the actual known ore bodies we are then operating. I want to say, without any disrespect to the geologists of our country, who have been doing a magnificent work, and who are doing in many ways work that is very useful, that they themselves change their ideas and their views after the miner gets his shafts and drifts and crosscuts through the rocks.

Difference in Cost of Mining

THE CHAIRMAN. What is the difference in cost of mining iron ore in the Gogebic Range by underground methods and a strip proposition, where you have the average amount of water to contend with, and an overburden, say, of 50 ft.?

MR. COLE. I have no doubt the difference would be in excess of $1 per ton, somewhere between $1 and $1.50.

THE CHAIRMAN. You have spoken of obtaining the Hill ores in order to meet any demand that might be made for ore. If the day you got these Hill ores you had had a demand for an increase of 80 per cent. in your ores to be delivered to the lower Lake ports, would you have gotten that ore from the Hill ore leases or from your old mines?

MR. COLE. We would have had to largely fill from our old mines, having them developed well ahead, so that we could meet almost any contingency with which we were confronted.

THE CHAIRMAN. Take the Mahoning Mine and the Hull Rust, where you have 160 to 200 acres stripped, and ore at a depth of 200 ft. Your capacity to deliver that ore is measured by the number of men obtainable and the capacity of the railroads to handle the traffic, is it not?

MR. COLE. The Hull Rust Mine was a pretty large shipper. It kept us fairly busy to take out, say, 3,000,000 tons per annum. But I have no doubt, if a contingency or an emergency arose, that we could double that output from the Hull Rust Mine.

THE CHAIRMAN. Quadruple it, could you not? For instance, here you have practically a square mile of exposed surface. You can put in any number of tracks, just lay the tracks on the ground, and go ahead with the steam shovels. What I am trying to get at is that the measure of your capacity to deliver that ore would be the capacity of trains to carry it from the mines to docks; would it not?

MR. COLE. That would be one factor in the situation. But when you quadruple your output that is a remarkable change. The difference between 3,000,000 tons and 12,000,000 tons is enormous.

Why the Steel Corporation Needs Vast Ore Supplies

MR. BARTLETT. How many million tons were in the Hill properties, do you think?

MR. COLE. Our engineers felt, like we all felt, that there was a possibility of a tonnage amounting to well up to 250,000,000 that would be found there.

MR. YOUNG. How many tons were under the land that was being stripped, about 30 acres, you think?

MR. COLE. I should say roughly 5,000,000 or 6,000,000 tons in that area that had been stripped; perhaps a little less than that.

THE CHAIRMAN. If you had known there were 250,000,000 tons there, no more or no less, would you have made this contract?

MR. COLE. If the matter had been left to me I should hesitate to make it for the reason that with the minimum imposed it would be exceedingly difficult to get the quantities that would have to be taken out each year from that total tonnage of iron ore. With the ore bodies much

smaller in extent than had been figured by Mr. Hill's engineers, I should hesitate to take over that lease and attempt to mine the minimum on that limited tonnage instead of a grand total of 500,000,000 or 600,000,000 tons.

THE CHAIRMAN. Suppose there had been 2,000,000,000 tons of ore there. Would it have been a good proposition?

MR. COLE. If there had been 2,000,000,000 tons the Steel Corporation never should surrender the lease.

THE CHAIRMAN. Why?

MR. COLE. Because the corporation would need it in its business. The growth of the iron and steel business in this country has been remarkable; and the growth of output of the United States Steel Corporation, forced upon it by the consuming public, the people who wanted steel, has forced the United States Steel Corporation to put millions and millions into plants and equipment to meet the necessities of the occasion, to meet the needs of the public in times of great prosperity, to give them enormous tonnages of steel output, and the corporation ought to figure as far ahead as it can in any district where ores can be made available to take care of that output. I believe today it can turn out 80 per cent. more steel than it could in 1901, when it was organized. That is a tremendous increase in the short space of a little over 10 years.

THE CHAIRMAN. You felt unless you did make this lease you had lost your opportunity to acquire any other available ore in large quantities on the Mesaba Range?

MR. COLE. Yes.

THE CHAIRMAN. Do you think that if tomorrow they should discover another Mesaba Range within 25 or 30 miles of you there, that it would affect the value of the ores in that region?

MR. COLE. I believe it would affect it to a reasonable extent; not on the prices this year, because they are abnormally low, but taking them over the next 10 years, I think it would have some effect on the value of these iron ores.

THE CHAIRMAN. How much of the Hill ores would have to be concentrated of the 250,000,000 tons there?

MR. COLE. I am utterly unfamiliar with the nature of the ores as shown by the development work that has been conducted since I left the corporation; but as a rough guess I should say 60 per cent. probably will have to be concentrated.

THE CHAIRMAN. What per cent. of the ore that is concentrated is silica, or sand, that has to be gotten out?

MR. COLE. It takes about a ton and six-tenths of crude ore to make a ton of merchantable product.

THE CHAIRMAN. What is the cost of concentration?

MR. COLE. The cost is very low. I should place it under 10 cents per ton.

The Steel Corporation's Proportion of American Ore Mines

MR. BARTLETT. At the time the Steel Corporation was organized, in 1901, and after it acquired these ores in the Hill lands, what proportion of the then available (I do not mean speculative) ores did that give the Steel Corporation in the United States, putting into it the Alabama purchase afterward, the Tennessee Coal & Iron Company?

MR. COLE. I should say about 25 per cent., including the 400,000,000 tons that I happened to hear Mr. Bacon testify as the holdings in the Alabama district.

MR. BARTLETT. What is its proportion of ownership in the Lake Superior region to-day?

MR. COLE. I should say somewhere between 50 and 58 or 60 per cent.

MR. BARTLETT. I will put the question this way: After the acquisition of the Hill lands, up to, say, 1910, what proportion of the ores in that region did the Steel Corporation own or had acquired at any time, whether it had disposed of them or not?

MR. COLE. I should say it was a little above two-thirds.

MR. BARTLETT. And with the addition of the Tennessee Company in 1907, what proportion of ores of the United States would that have given? I do not mean speculative or what may happen in the future; I mean the available merchantable ores of the United States.

MR. GARDNER. I presume there is a greater merchantable supply today than there was in 1907.

MR. COLE. I presume there is.

MR. GARDNER. That is, more inferior ore is being used, and that makes the supply greater.

MR. COLE. Yes.

MR. BARTLETT. You were a member of the Steel Corporation when these ore holdings were obtained, were you not?

MR. COLE. I was an officer of the Oliver Iron Mining Company, one of the subsidiary companies of the United States Steel Corporation.

The Question of Monopoly

MR. BARTLETT. Now, what could have been the inducement, from a business standpoint or any other standpoint, for the Steel Corporation to acquire the Hill property at the price paid for it?

MR. COLE. The mining costs on the Mesaba Range are so much lower, the ores are made so much more quickly available than they are on the old ranges, in mines where the ore deposits are deep-seated, that that was a considerable incentive in securing what the corporation supposed was a very large tonnage of ore on that range, and tying it up at least until an opportunity could be had to explore it thoroughly.

MR. BARTLETT. There was some idea, too, of keeping other people from getting it, was there not?

MR. COLE. Not in the least. The corporation was out to look after its business needs and the conditions confronting it. When the iron and steel business of this country could be measured up in requirements of 9,000,000 and 10,000,000 tons of iron ore from the Lake Superior each year it was altogether a different proposition from the time when we were outputting 44,000,000 tons of iron ore each year. The tremendous amount of money that had to be put into the transportation facilities in providing the means for shipment, into building the necessary blast furnaces, into building the enormous steel works—in view of that situation, there would not be any prudent business men on earth who would dare to invest these enormous sums of money into these various enterprises, that were going to keep increasing year after year, as the growth of this country demanded, without seeing they had the raw material to justify such an enormous expenditure.

MR. BARTLETT. I understand that; that the enormous investment of money, the enormous expenditures, were made with a view of controlling the trade in that particular business.

MR. COLE. Not controlling it. It was a good, fair ratio of the total tonnage of this country, and it wanted to keep manufacturing—

MR. BARTLETT (interposing). What was the purpose then of creating a corporation and consolidating all these various corporations, if it was not to control the trade?

The Days of Sharp Competition

MR. COLE. I have not any doubt but that it was designed for a steadying influence in the trade; I have not any doubt but that it was designed for that. For I want to tell you I never again wish to see the mining industry in the Lake Superior region put back to the time when we had to put our hands deep in our pockets to pay the miner who was working for $1.20 and $1.40 a day, going down into the mines and laboring many hours each day, to turn out a large output per day, and when we were getting it out, shipping it to Lake Erie, and in some cases having to sell for $2 a ton. I never want to see that time again; I never want to see the time when the children of those men working in the mines did not receive proper clothing to go to school, when the good, intelligent, honest laborers of this country were crowded down to a point where they were receiving what they were at that time. Since the organization of the Steel Corporation and other companies engaged in manufacturing steel in this country, there has been an ever-increasing addition to the price paid the laboring man up in our district, until to-day he is receiving I consider a fair recompense for the work he performs, and is able to take care of his family as he should care for it. I never want again to go back to the old days when severe competition was in existence, when we had to mine these ores and send them down for a mere pittance, although the Lake Superior mining district produces the best ore in the world outside of that district which may produce it some time, located in Brazil.

MR. BARTLETT. You do not believe in competition in business?

MR. COLE. I believe in reasonable competition. I do not believe in competition that compels people to pay wages that were paid during the period to which I refer, prior to the organization of the Steel Corporation.

MR. BARTLETT. You think then that the Steel Corporation has prevented what you call destructive competition?

MR. COLE. I believe the Steel Corporation has had a steadying influence on the trade, and I believe that it has to a reasonable extent prevented destructive competition, although prices have fluctuated during the time that it has been in existence, due to the lessened demand at times.

MR. BARTLETT. Have the hours of labor been lessened since that time?

MR. COLE. In some cases they have. In the iron mining district of Lake Superior I believe the hours of labor have been pretty nearly the same since the organization of the Steel Corporation as before, except that recently I think there has been some modification. Our miners under-

ground have worked nine hours a day a portion of the time, about one hour being consumed a day in getting from their change houses into the mines and getting to their places of work, and getting away from them.

MR. YOUNG. Recently have not all the iron mines in the Michigan district gone on the eight-hour basis?

MR. COLE. I was advised while I was in the South that they had changed their hours of labor to eight hours.

MR. GARDNER. Does that mean eight hours from the mouth of the mine back to mouth of the mine?

MR. COLE. No; I understand it will be to wherever they work.

MR. GARDNER. And when you are speaking of nine hours, do you mean nine hours' actual work or nine hours from the mouth of the mine to the mouth of the mine?

MR. COLE. Ten hours from the mouth of the mine to the mouth of the mine.

Advantages or Essentials?

MR. BARTLETT. Taking all its facilities and adding them all together—the ownership of ore in the Lake Superior district, the ownership of the Tennessee Coal & Iron Company, the ownership of railroads, owned through subsidiary companies, and also steamship lines—does that not give the Steel Corporation an immense advantage over what we call independent manufacturers, or those competing with the corporation?

MR. REED. You mean an immense unfair advantage?

MR. BARTLETT. I did not use the word "unfair" at all.

MR. REED. I know you did not, and that is why I thought the question was ambiguous.

MR. BARTLETT. If you insist, I will put it that way. I do not care to use the word. I mean an immense business advantage.

MR. COLE. Will you not allow me to answer the question in my own way? I would say the ownership of the very best bodies of iron ore in the Lake Superior district by the Steel Corporation gives it some advantage; the ownership of railroads in Minnesota, transporting that ore down to the Lakes, gives it some reasonable advantage; the ownership of steamship lines does not give it such a very large advantage, because a great many of the boats are pretty old, and they only carry very small tonnages as compared with modern ships that are being built today. As to the advantages after the ore reaches the point of consumption, I cannot see why other people may not be in just as good a position. But as to the upbuilding of these plants, the putting of them in good shape, as the Steel Corporation officials are doing, I should say that it has a reasonable advantage over the other competitors.

MR. BARTLETT. Not an unreasonable one?

MR. COLE. Not an unreasonable one.

MR. BARTLETT. You think then it is proper public policy—I do not know that we can control it—to permit corporations engaged in business, like the Steel Corporation, to own transportation companies, public utilities, like railroads and other things, facilities of that sort?

MR. COLE. Well, I am familiar with its ownership of railroads in the Northwest, in the ore-producing region, and I should say that up there, with the short season of Lake navigation, only seven months in the year, it is almost essential that it should own and control the transportation facilities for getting out the enormous tonnage of iron ore that it is forced to send down to the Lake ports each year. If perchance some condition would ensue up there that it was not getting the ore down, and some consuming interests of this country should suffer, what a hue and cry would be raised, that they could not get it in a hurry. When it is once provided for during the seven months of the Lake navigation season, it has got to be moved in a hurry.

THE CHAIRMAN. If some expert railroad man would guarantee an average return of 150 per cent. on its capitalization, and 66 2/3 per cent. on its operating charge, you could get a little of that ore hauled for you.

MR. COLE. I have not any doubt a lot of railroad men would like to do that business up there. I have no doubt about it.

THE CHAIRMAN. As long as they made that much, they would be pretty likely to do it.

MR. COLE. I would like to answer your question by again stating that by reason of the volume of material that has to be moved in the short season, some years six months of Lake navigation, it is almost essential that the Steel Corporation should itself haul that amount of ore.

THE CHAIRMAN. Don't you think as a business man, don't you believe that any common carrier, realizing he could get 66 2/3 per cent. for an expenditure of 33 1/3 per cent., would be pretty diligent in turning over his money?

MR. COLE. There was not anybody diligent to build roads up into that region when the operating companies first went up there and wanted transportation facilities.

MR. REED. I fancy lots of people would be glad to take the successful parts of the Steel Corporation over now that would not have been so anxious to take them at the beginning.

[Mr. Cole was asked about the cancellation clause in the Hill ore lease to the Steel Corporation. He said that the fact that there was serious difference in the estimated tonnages of ore in the ground was quite sufficient to lead the Steel Corporation to insist on the surrender clause. As to arrears on minimum tonnages, he said it was probable that on some of its properties outside the Hill lease the corporation was in arrears 10,000,000 to 12,000,000 tons, conditions in the steel trade not having been normal for three or four years.]

Cost of Drying and Nodulizing Cuban Ores

[The inquiry then turned to ore supplies outside the United States. Of the Cuban deposits Mr. Cole said that those in the Mayari and Moa districts probably contained 2,000,000,000 tons. This ore carried 24 per cent. of moisture and the cost of drying and nodulizing it was now about $1 a ton, which is high, but would no doubt be lowered as larger tonnages were handled and the operation was better understood. He thought fully 1,000,000,000 tons of northern Cuba iron ore was to be found in the properties of ore companies who expected to sell in the market and were not engaged in the steel business themselves.]

MR. YOUNG. How far west, in your judgment, could that ore be introduced into the United States in competition with Lake Superior ores?

MR. COLE. Well, in normal years, I believe that the ores could eventually go as far west as the Pittsburgh district, and with the completion of the Erie Canal it could be landed at ports on Lake Erie for the manufacture of iron and steel. Please remember that I say "in normal years."

MR. YOUNG. Yes. Why do you use that term, Mr. Cole?

Prices of Lake Ores Too Low to Keep Some Mines Going

MR. COLE. Well, I consider that we are passing through an abnormal period just now in the iron and steel business in this country. Prices are very much depressed, and are far too low to afford even a reasonable profit. Many of the independent concerns are trying their best to make a little money and cannot. They are doing everything on earth to secure their raw material at a very low price, so low that we are seriously considering closing down a mine I am interested in up on the Marquette Range, because we cannot afford to sell our ore to them at the figures they are offering. Therefore, this is not a year that is normal in the steel business.

MR. YOUNG. Has that Cuban ore district been thoroughly explored yet, so that they are reasonably certain that there will not be any more ore discovered there?

MR. COLE. No, sir; I believe that there will be considerable additional tonnages found when they get further away from the coast, back into the interior. At the point where these ores exist the mountains rise up quite rapidly from the sea—the Moa mountains—and the ore has been found to extend up to their crest and on some tablelands in the interior. A great deal of the material has been weathered and taken away, scored out by the stream of waters as they have fallen on these mountains, and washed down into the sea. But I believe they will find additional tonnages, perhaps not large quantities, because I think the largest quantities have been found.

Brazil as a Source of Iron Ore Supply

MR. YOUNG. Have you any knowledge about Brazilian iron ore deposits?

MR. COLE. Only through reports of engineers that I sent to Brazil to examine these deposits.

MR. YOUNG. What did you learn from those reports?

MR. COLE. The ores are of an exceedingly high grade and in very large quantities. The water content is very low and the iron is very high, and in a very large amount of it the phosphorus element is very low. Judging from the development work that has been done there, with drilling and prospecting and visible ore in sight, I think we would not be overestimating in saying that there is at least 1,500,000,000 tons to 2,000,000,000 tons of ore there.

MR. YOUNG. Where is this ore in Brazil?

MR. COLE. It is inland 150 to 160 miles. They are now building a railroad from the seaboard to Victoria, following a river up into the interior. The headwaters of the stream rise up where these ore bodies exist, so that they should have fairly good grades from the mines down to the seacoast, just as in the Lake Superior district they have fairly good grades from their deposits down to the Lake ports.

MR. YOUNG. Have those ores been picked up to any extent by steel men?

MR. COLE. I am told that Englishmen interested in iron and steel manufacturing have secured quite a considerable tonnage there. I am told that there are large quantities

that could be secured from the Brazilian government, and that there are large quantities now secured by a group of men who are interested in iron ore matters in this country, and no doubt large additional tonnages could be found and developed in a district as important as that one is.

THE CHAIRMAN. How far is it from the Brazilian port to the American port where this haul would come to?

MR. COLE. It is a long distance, and the ocean rate is pretty high, but, on the other hand, the grade of ore is very high.

THE CHAIRMAN. Is it Bessemer or non-Bessemer?

MR. COLE. A large proportion of it is high grade Bessemer ore, very high in iron and low in phosphorus, while in other districts they have tonnages of non-Bessemer ore as well.

THE CHAIRMAN. Would it be practicable in your opinion any time in the near future to import ores to this country from Brazil, and smelt them in competition with our ores?

MR. COLE. If a line of steamers carrying 18,000 or 20,000 tons of iron ore were built to transport the ores from Brazil to seaboard cities in this country, with a reasonable amount of return cargoes to Brazil, I believe that those ores would come into competition with the ores of this country. The metallic content is high and the moisture low.

MR. REED. In regard to ores in Utah, Cuba and Brazil. Perhaps Mr. Cole could tell us whether the Steel Corporation ever made any effort to acquire ores or to control or get a large part of those ore beds.

MR. COLE. The Steel Corporation through its subsidiary, the Oliver Iron Mining Company, had examinations of ore beds in Utah made, but did not feel justified at that time in buying any at that point. It also had its engineers make an examination of the ore beds in Brazil four or five years ago, but did not make any investments there. It has secured some ore in Cuba, but just what tonnage I am unable to say.

MR. REED. Relatively small, is it not?

MR. COLE. I believe so.

THE CHAIRMAN. Was it a lease or the purchase of the fee hold?

MR. COLE. All the operators in Cuba at the present time own the fee, I believe. There may be a very small area leased, but I believe the major portion of that is owned in fee.

Cuban Fees at One Cent a Ton

THE CHAIRMAN. What does the fee cost per ton?

MR. COLE. Well, the ore has been secured from private owners down there or from the Cuban government direct. I do not believe there has been any transaction, unless possibly Mr. Schwab made some purchases down there, at less than 1 cent a ton for the fee.

THE CHAIRMAN. Do you know what you paid a ton for the Steel Corporation?

MR. COLE. I do not. It secured those after I left its employ. I believe the Steel Corporation explored for its ores down there, found them and secured a title to them from the Cuban government. I think that was so, but I am not sure about it.

THE CHAIRMAN. Do you know what it paid the Cuban government?

MR. COLE. I do not.

THE CHAIRMAN. In 1909, I think it was, the Geological Survey issued a little bulletin on Cuban ores, in which it made the statement that the Spanish-American Iron Company bought its ore lands at $2.47 a hectare, and that as an additional inducement the lands were exempted from taxation for a certain number of years.

MR. GARDNER. You were here yesterday when Mr. Sellwood was testifying as to the ore resources of the United States.

MR. COLE. Yes, sir.

MR. GARDNER. He estimated 50,000,000 tons in Texas. Have you any comment to make on that?

MR. COLE. I believe there is a very much larger tonnage in Texas. From the reports I know of I should say there is between 500,000,000 and 600,000,000 tons.

MR. GARDNER. Do you know anything about any ore deposit in Mexico?

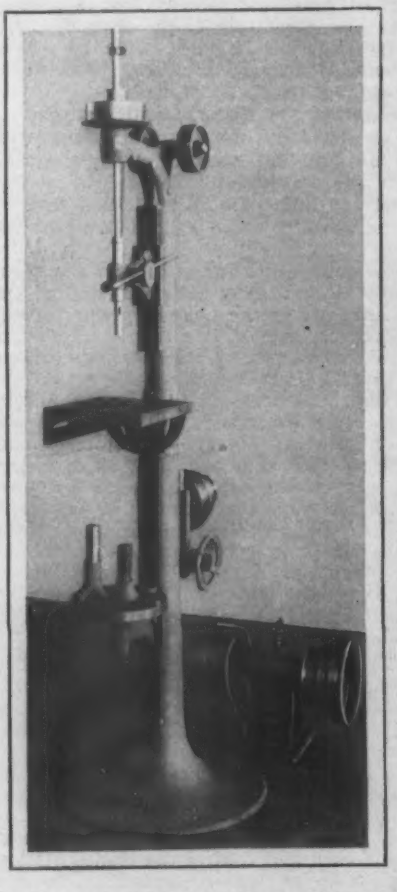
MR. COLE. I know in a general way there is a very large deposit of iron ore at Durango, Mexico—anywhere from 30,000,000 to 60,000,000 tons there.

MR. GARDNER. Do you know of any other large deposits in Mexico?

MR. COLE. We have had some deposits away down in the southern part of the country examined at Tulancingo, State of Hidalgo. A very beautiful ore exists there. It is a wild country. It is only where the mountain trails happen to cross the deposit of iron ore that anything is known about them. In the interior there is no incentive for people to go and find iron ore. Undoubtedly very large additional quantities exist, but there is nobody going after it and no way of using it.

New Washburn Drilling Machine

A new 14-in. high-speed drilling machine has been recently placed on the market by the Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass. In general appearance this machine is practically the same as the 14-in. sensitive drill, which has been built for a number of years, although there are several features which distinguish it from the older machine. Among these are an increase in capacity to enable it to carry 9/16-in. high-speed drills, the fitting of all running pulleys with loose Tobin bronze bushings, the fitting of the spindle with a thrust bearing and increase of over 50 per cent. in the weight of the machine and the use of automatically locked belt tighteners to control the tension of the belt.



A New 14-In. High-Speed Drilling Machine Built by the Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass.

The spindle is graduated in inches and is counter-balanced by a weight within the column. It has a traverse of 3 in. and is adjustable vertically for 13½ in. The spindle driving pulley is supported on an independent bearing which takes the entire pull of the belt so that the spindle runs absolutely free. The bearing upon which this pulley runs is always flooded with oil, a retaining ring being cast concentric with the bearing to form a basin which holds the oil and prevents spattering.

Like the 15-in. drill, which was illustrated in *The Iron Age*, December 28, 1911, this machine is equipped with an automatic locked belt tightener, a feature which is considered by the builder as one of the most valuable ones ever incorporated in a machine tool. With it the tension of the belt can be increased or decreased instantly at the will of the operator, the only labor necessary to accomplish this being the turning of a hand wheel. The action of turning the hand wheel releases the locking device which is relocked when the hand wheel is released. It is emphasized that this device is so simple that there is nothing to get out of order, and in tests it has resisted a pull of 1200 lb. before slipping.

Both round and square tables are included in the equipment of the machine, the former swinging around the column and being capable of tilting to any angle. The round table has a vertical adjustment of 29 in. and can be removed, and a cup or crotch center, both of which are furnished with the machine, placed in the supporting bracket.

The hight of the column is 6 ft., and the hight of the machine with the spindle raised is 1 ft. more. The speed of the countershaft is 475 r.p.m., and the net weight of the machine and the countershaft is 350 lb.

The Economy Elevator Guide Lubricator

To overcome the difficulty caused in elevator operation by excessive friction the Peterson Engineering Company, 50 Church street, New York City, has designed and placed on the market a device for lubricating elevator guides. This device to which the name of the Economy elevator guide lubricator has been given is made for all types and sizes of cars, and standard attachments are provided so

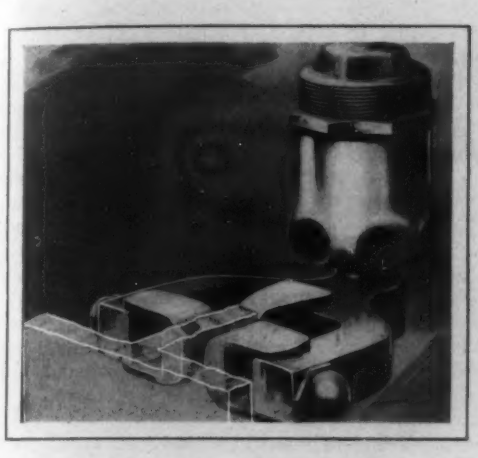


Fig. 1—The Economy Elevator Guide Lubricator for Steel Rails Made by the Peterson Engineering Company, New York City

that they can be placed on any of the ordinary types of elevators without difficulty. The special advantages claimed for the device are application of the lubricant where it is needed, safety to employees and economy in the amount of material used. The type of lubricator designed for use with steel guide rails is illustrated in Fig. 1, while details of the lubricator are given in Fig. 2.

The lubricator employs grease. The main body is a hollow casting, *a*, Fig. 2, to which is attached a special compressed air grease cup, *b*. In ordinary operation the cup has to be filled only once every eight or twelve weeks, and an occasional turn of the top nut *c* compresses the air entrapped in the cup so that there is always sufficient pressure to force the grease out through the arms of the lubricator *d* and upon the guide rails *e*. A thin ribbon of grease is fed against the guide rails exactly where the guide shoes *f* bear. The construction of the distributors at the end of the side arms varies slightly with the size and shape of the guide rail. Springs *g* are employed to keep

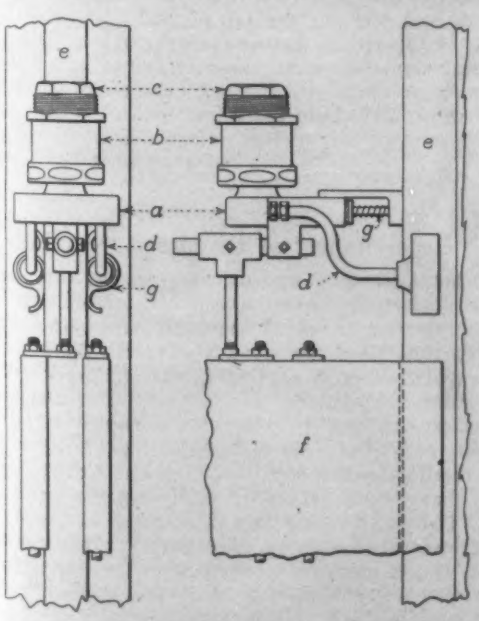


Fig. 2—Details of the Device

these parts, regardless of their size and shape, pressed tightly against the face of the rail so that it is pointed out in spite of any swaying of the cars the lubricant is always applied in the right place.

The record of a test made on one of the elevators in the 168th street station of the New York subway has been received. Before the lubricator was installed the average consumption of grease per month was 480 oz., while afterward it was reduced to 30 oz., and a reduction in the amount of power required to operate the elevator was noted.

Worcester Pressed Steel Company's Improvements

The Worcester Pressed Steel Company, Worcester, Mass., is planning to erect a building which will be equipped for cold rolling strip steel. This will increase present facilities and equipment for cold rolling, shearing, pickling, oiling, annealing, etc. The company may not erect this building for six months, not having completed the plans, but the size will be about 100 x 200 ft., fireproof, of concrete, steel and glass construction. Probably five stands of rolls will be installed to begin with, from 5 to 20 in. wide.

A new foundry building, 21 x 31 ft., is now being completed. It is of steel and glass construction, and will be used for making high-grade steel and semi-steel castings. It is equipped with a new Paxson cupola, etc. Special castings will be made from the company's own formulas for dies, die beds, etc. It does not solicit jobbing work in this line of casting. A new office building, 50 x 100 ft., two stories, is also being completed. The space occupied by the present office in the main building will be added to the tool and die-making department, drafting room and superintendent's office as soon as the new building is completed.

The company has just installed a large new double-action toggle drawing and reducing press. This weighs about 200,000 lb. It has a bed area of 60 x 60 in. and capacity for exerting a pressure of about 1000 tons. This press will be used for making the new Worcester pressed steel pulley as well as heavy pressed steel rear axle housings, differential gear covers, frame members, brake drums, seamless drawn cases, etc., for automobiles and auto trucks; pressed steel shelving, auto starter shells, tanks and other large and heavy cold pressed metal parts 48 in. and less in diameter or length, by 13 in. and less in depth, by 1 in. and less in thickness. In addition to this large toggle type press several large power presses have also recently been installed for cold forging, coining and drawing, each of 1000 tons capacity, each being motor-driven by Connecticut River power.

The company specializes in cold seamless hollow drawing, pressing, coining, embossing, forming and stamping parts from sheet steel, brass, copper, aluminum, silver and other sheet metals to its customers' designs. It draws moldings, tubes and special shapes up to 22 ft. long by 2 in. diameter by ⅛ in. thick metal. It also carbonizes and heat treats pressed steel. It reports business very good, showing great improvement over one year ago.

German Iron and Steel Statistics

The Imperial Statistical Office of Germany has published the following statement of production and values in the iron industry in the past two years:

	Metric tons		Values in dollars	
	1911	1910	1911	1910
Iron ore.....	29,879,361	28,709,700	$27,270,000	$25,430,000
Pig iron, total...	15,280,527	14,502,183	202,502,000	187,130,000
This total includes:				
Foundry iron..	2,786,437	2,641,518	38,894,000	34,622,000
Basic iron.....	9,785,056	9,314,943	121,061,000	114,131,000
Spiegeleisen and steel making grades	1,547,480	1,437,877	25,453,000	22,903,000
Castings of second melting	2,722,028	2,550,234	117,990,000	108,000,000
Blooms, billets, muck-bars, etc.	2,601,606	2,251,044	55,200,000	47,044,000
Finished basic products	10,703,535	9,620,897	359,527,000	322,500,000

Correction.—In the Trade Publication notices which appeared in *The Iron Age*, April 4, 1912, on page 902, a catalogue of pipe cutting and threading machinery was credited by a stenographic error to the Standard Machinery Company, Ellwood City, Pa. It should have been the Standard Engineering Company of that city. As is well known the Standard Machinery Company is located at Providence, R. I., and builds an entirely different line which includes roller bearings, presses, etc.

Correspondence

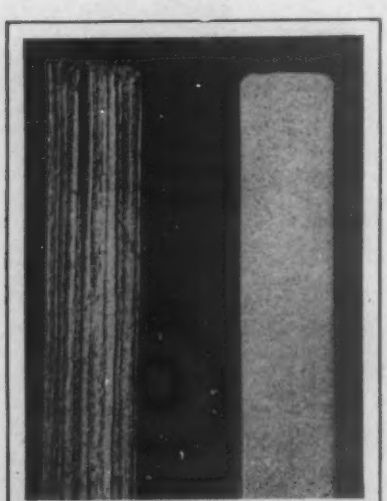
The Cinder-Coated Fibers of Wrought Iron

To the Editor: Replying to Mr. Fleming's letter published in *The Iron Age* of April 11, would say that in his first article he deplores the selection of the word "fibrous" when used in connection with wrought iron as unfortunate; and he further states that, while there can be no objection to the use of the word to describe the appearance of the fracture of the metal, he felt that when the meaning of "fibrous" was distorted into "fibers" it was time for him to object. He now admits that staybolt iron has a fibrous structure. If iron is fibrous there is certainly a limit to each individual fiber; in other words, there must be some kind of a division between it and its neighbors, for if there were no division the metal would be homogeneous and not fibrous. I must confess that I have not gone very deeply into micro-metallography and may therefore be excused for my unscientific expressions; but I fail to understand how a thing can be fibrous and at the same time not have any fibers.

William F. Durfee in his paper read before the Franklin Institute (August, 1896) on "The Conditions Which Cause Wrought Iron to Be Fibrous," says:

> In the "boiling" of the melted metal in a bath of liquid cinder * * * the iron (which, owing to its loses of carbon, etc., can no longer remain fluid at the temperature employed) begins to solidify in the form of small granules or crystals, which can be seen moving amid the boiling cinder like white-hot peas in a red-hot soup. * * * The direct consequence of the elongation of its compound crystals and the effort of the intervening cinder to escape in the direction of least resistance while the "bloom" is being forged or rolled, is the establishment of that structural peculiarity in the resulting bar known as "fiber," which is one of the most conspicuous features of wrought iron, and one not found in any other variety of ferruginous materials. * * * It is well to remember that when we speak of "less space" in describing the contiguity of crystals (granules) of wrought iron, we are dealing with a very small dimension; in fact, one very near neighbor to the infinitesimal.

Or, in other words, as each pea in the soup is coated with soup, so *each globule of iron* when "coming to nature" in a puddling furnace *is coated with cinder.* When squeezed together some of the liquid coating will be so much reduced in thickness at the points of contact between the globules as probably to cause some of the molecules in the cinder film to part, forming a kind of fine gauze, and through the orifices of this gauze the globules will weld together (although Mr Durfee believed that when the cinder film is very thin there is considerable cohesive attraction). At the same time there are other and larger particles of cinder locked in without any chance to escape (surplus cinder), and as the whole mass becomes elongated by the subsequent manipulations, there is nothing else for this cinder to do but to elongate also.



Appearance of Iron and Steel After Immersion 15 or 20 Minutes in a Solution 9 Parts Water, 5 Parts Sulphuric Acid and 1 Part Muriatic Acid.

WROUGHT IRON STRUCTURE ILLUSTRATED.

I present herewith an illustration published in *The Iron Age* of December 23, 1909, which shows this better than words can do, and at the same time it shows how different the structure of wrought iron really is from the structure described by Mr. Fleming—i. e., that "by reason of the intermolecular attraction between the iron particles they will fuse into one metallic mass." and "forcing the small amount of entrapped cinder to distribute itself haphazard throughout the mass." The photograph plainly shows the elongated cinder fibers and also shows that there is a rather limited amount of room left for any large and continuous metallic mass. The "intermolecular attraction" cannot annihilate the cinder and if that cinder cannot get out of the way the only thing for both the iron and the cinder to do is to elongate together, thus producing a fibrous structure.

It is gratifying to note that Mr. Fleming now admits that I might perhaps be right in assuming that the superiority of wrought iron staybolts over steel ones is due to the fibrous structure of the wrought iron and that "this fibrous structure is due entirely to streaks of cinder running at random through the metal." There must certainly be some virtue in these cinder streaks to cause wrought iron to stand 20 times as many vibrations as steel. This also answers Mr. Fleming's assumption that a metal composed of such individuals (elongated globules) would not stand a tensile strain of 5000 lb. Even in the imaginary lead strip, rolled cold from the box filled with shot and oil, each individual shot has been elongated to about 100 inches, and, considering that they will overlap possibly halfway the joints made by the fibers of the neighboring shot, the finished strip would probably be very little weaker than if made from solid lead.

CHEMICAL PURITY OR PHYSICAL STRUCTURE?

However, we have strayed from the original point at issue. Mr. Fleming agrees with us fully that wrought iron in service resists corrosion better than steel and he only disagrees with us in reference to the explanation. We contend that it is due entirely to the physical structure and the "cinder-coated fibers in wrought iron," while Mr. Fleming declares this theory absurd and claims that the superiority of wrought iron is due entirely to the extreme purity of the iron crystals between the streaks of cinder and that the cinder itself has nothing to do with it. In our pamphlet we give many practical reasons to back up our contention, while Mr. Fleming backs up his theory with scientific deductions based on laboratory tests. It is but natural for the steel maker to wish that this greater rust-resisting quality of wrought iron were due to its chemical purity rather than to its physical structure. The former can easily be approached in the open hearth furnace, while the latter can never be imitated by any steel making process that refines the metal in a fluid state. The wish may be father to the theory, but it cannot alter facts.

I do not care to take up any more of your valuable space, as theoretical discussions are of less value to the practical man than facts based on actual experience and no doubt an answer to the last question of my previous letter would have been more interesting.

GEORGE SCHUHMANN,
General Manager Reading Iron Company.

READING, PA., April 17, 1912.

Legal Aspect of License Agreements

To the Editor: Many of your readers may be sufficiently interested in the recent decision of the United States Supreme Court in the Dick mimeograph case to wish to understand the grounds on which the court based this important decision. During the last week the court has denied the petition for rehearing. This may perhaps be because Justice Day, who was necessarily absent when the case was first argued, and Justice Pitney, who has been recently appointed to the Supreme Court, had such views that a rehearing would likely not change the decision. The decision will therefore stand as a direct pronouncement of the law by the highest court in the United States, and is naturally of interest to the American engineers who are brought so closely into contact with patented machines and devices.

THE DICK MIMEOGRAPH CASE

This case relates to the rotary mimeographs of the A. B. Dick Company which are each sold with a license restriction stamped upon the machine, specifying that it may be used only with stencil-paper, ink and other sup-

plies made by the Dick Company. The defendant Henry sold ink to one of the users of these mimeographs and was sued for contributory infringement on the ground that such a sale aided and promoted the unauthorized use of the patented machine. The majority opinion of Justice Lurton, with whom three other justices concurred, held that the defendant was guilty of infringement in selling ink to the user of such a restricted patented machine.

The whole subject has been brought prominently to public attention by the vigorous dissenting opinion of Chief Justice White, which was supported by two other members of the court. His opinion indicates that such restricted licenses of patented articles would enable the patentee to control unpatented goods and even bring standard supplies or articles of general utility within this patent monopoly. The Chief Justice's dissenting opinion contained the following striking statements as to the effect of the majority decision:

Take a patentee selling a patented engine. He will now have the right by contract to bring under the patent laws all contracts for coal or electrical energy used to afford power to work the machine or even the lubricants employed in its operation. Take a patented carpenter's plane. The power now exists in the patentee by contract to validly confine a carpenter purchasing one of the planes to the use of lumber sawed from trees grown on the land of a particular person or sawed by a particular mill. . . .

My mind cannot shake off the dread of the vast extension of such practices which must come from the decision of the court now rendered. Who, I submit, can put a limit upon the extent of the monopoly and wrongful restriction which will arise, especially if by such a power a contract which otherwise would be void as against public policy may be successfully maintained?

THE EXCLUSIVE CHARACTER OF A PATENT

The statutes passed under the provision of the constitution relating to inventions have created and defined the rights which are conferred upon the inventor who secures a patent in return for disclosing to the public the invention which he has made. The majority opinion of the court refers to the exclusive character of the patent right and to the power thereby granted to the patentee to prevent others from making any use of his invention throughout the term of the patent in case he so desires. The patentee having absolute control of the situation during the life of his patent can make such terms as he wishes with those who wish to manufacture the patented device. The control of the price of articles which are covered by patents is familiar.

The majority opinion written by Justice Lurton in the Dick mimeograph case makes the following reference to the earlier National Harrow case, 180 U. S., 70, in which price and other restrictions were discussed.

Touching the right of the patentee to exclude all others from the use of his invention, the court quoted with approval what was said in the Button Fastener cases. 77 Fed. Rep., 288, as follows:

"If he sees fit, he may reserve to himself the exclusive use of his invention or discovery. If he will neither use his device nor permit others to use it, he has but suppressed his own. That the grant is made upon the reasonable expectation that he will either put his invention to practical use or permit others to avail themselves of it upon reasonable terms, is doubtless true. This expectation is based alone upon the supposition that the patentee's interest will induce him to use, or let others use, his invention. The public has retained no other security to enforce such expectations. A suppression can endure but for the life of the patent, and the disclosure he has made will enable all to enjoy the fruit of his genius. His title is exclusive, and so clearly within the constitutional provision in respect to private property that he is neither bound to use his discovery himself nor permit others to use it."

THE USE OF LICENSE RESTRICTIONS

such as employed by the Dick Company has not previously been directly passed upon by the Supreme Court, but has been repeatedly held by the lower courts to be justified from the legal standpoint, and it seems to be a logical result of the exclusive rights granted to a patentee during the limited term of his patent. The majority of opinion is based on this ground and upon analogy to the price control under patents as is seen from the following quotation:

If the stipulation in an agreement between patentees and dealers in patented articles, which, among other things, fixed a price below which the patented articles should not be sold, would be a reasonable and valid condition, it must follow that any other reasonable stipulation, not inherently violative of some substantive law, imposed by a patentee as part of a sale of a patented machine, would be equally valid and enforceable. It must also follow that if the stipulation be one which qualifies the right of use in a machine sold subject thereto, so that a breach would give rise to a right of action upon the contract, it would be at the same time an act of infringement, giving to the patentee his choice of remedies.

But it has been very earnestly said that a condition restricting the buyer to use it only in connection with ink made by the patentee is one of a character which gives to a patentee the power to extend his monopoly so as to cause it to embrace any subject, not within the patent, which he chooses to require that the invention shall be used in connection with. Of course the argument does not mean that the effect of such a condition is to cause things to become patented which were not so without the requirement. The stencil, the paper and the ink made by the patentee will continue to be unpatented. Anyone will be as free to make, sell and use like articles as they would be without this restriction, save in one particular—namely, they may not be sold to a user of one of the patentee's machines with intent that they shall be used in violation of the license. . . . If a patentee says: "I may suppress my patent if I will. I may make and have made devices under my patent, but I will neither sell nor permit anyone to use the patented things," he is within his right, and none can complain But if he says: "I will sell with the right to use only with other things proper for using with the machines, and I will sell at the actual cost of the machine to me, provided you will agree to use only such articles as are made by me in connection therewith"; if he chooses to take his profit in this way instead of taking it by a higher price for the machines, has he exceeded his exclusive right to make, sell and use his patented machines? The market for the sale of such articles to the users of his machine, which, by such a condition, he takes to himself, was a market which he alone created by the making and selling of a new invention. Had he kept his invention to himself, no ink could have been sold by others for use upon machines embodying that invention. By selling it subject to the restriction he took nothing from others and in no wise restricted their legitimate market.

THE CASE REGARDED AS BREACH OF CONTRACT

On the other hand, the dissenting opinion of Chief Justice White interprets the transaction as though the machine had been sold without condition as to giving the purchaser full title to it and the right to use it in any way whatever, and then as though the Dick Company made a separate contract with the purchaser, subsequently, a week or so later, for instance, not to buy ink or other materials from other manufacturers. This construction is held to deprive the United States Courts of jurisdiction and to allow merely the ordinary suit for breach of contract in case outside materials are used, without involving any possibility of patent infringement. This interpretation of the license restriction is urged on the ground of public policy as a means of obviating such broad patent control of machines or articles.

The patent system which has contributed so much to American industrial development is based upon the exclusive rights granted to the inventor to control his patented invention in any reasonable way that he may see fit throughout the term of his patent. In the past this exclusive right has been used wisely and with reasonable regard for the public interest. This is because the patentee in order to secure the best results must introduce his patented device promptly and widely to secure the best return. For these reasons most concerns prefer to resort to some other arrangement than the somewhat cumbersome license system of the Dick Company for instance, and prefer to sell outright the patented articles on such terms as to create a widespread demand for them. It is perfectly apparent, as the Supreme Court intimated in the majority opinion, that the patentee who imposes burdensome conditions, whether by way of purchase price or conditions of use, is limiting the sale of the patented article and defeating his own ends.

PATENT LAWYER.

NEW YORK, April 8, 1912.

The Inland Steel Company, Chicago, is completing as an addition to its structural mill a building for the fabricating of tie plates. Two Long & Alstatter tie plate punching and shearing machines have been installed, and tie plates are being made on a contract recently taken. It is the intention of the company to confine its tie plate output to the standard forms of plate. The tonnage thus afforded furnishes a desirable addition to the structural mill schedule.

The Stephenson Charcoal Iron Company is completing the erection of its blast furnace at Wells, Delta County, Mich. The furnace will be operated in connection with the plant of the Mashek Chemical & Iron Company, which adjoins it. Charles H. Shaffer, Marquette, Mich., is at the head of the company.

The Prest-o-Welder

The Prest-o-Lite Company, Indianapolis, Ind., has recently brought out a new type of oxy-acetylene welding apparatus known as the Prest-o-Welder. The Prest-o-Lite Company manufactures its own gas tanks and has developed the practice of welding to a degree that makes it an expert in the knowledge of the art. Upon the basis of the wide experience thus acquired, the welding apparatus which it is now marketing has been developed. This company also maintains a special welding department in which a large amount of outside work is being repaired.

A New Type of Oxy-Acetylene Welding Apparatus Developed by the Prest-o-Lite Company, Indianapolis, Ind.

The Prest-o-Welder makes use of the storage system for the acetylene gas rather than the use of a generator as a part of the equipment. The adoption of the storage method makes the welder a portable as well as a stationary equipment. In addition the acetylene gas so supplied is cool and has been previously and thoroughly dried and purified before being compressed in the storage tank. The equipment consists of an acetylene and an oxygen tank, each of 100 cu. ft. capacity mounted on a two-wheel truck, the entire outfit weighing about 200 lb. Each tank is fitted with a regulating valve, and the one on the acetylene tank automatically maintains a constant flow of gas while that on the oxygen tank has an inlet gauge showing the pressure and the amount of oxygen in the cylinder as well as an outlet gauge showing when the regulator is set for delivering oxygen at the required pressure. The blow pipe is of a design developed by the company and it is of the injector type. Extra oxygen and acetylene tanks are furnished with the equipment to be used when the regular set is being recharged.

The Wheeler Condenser & Engineering Company, Carteret, N. J., announces the appointment of Nathan Owitz, as manager of its Cincinnati office. He has been in the sales department at the home office of the company for the past six years and is fully acquainted with the various lines of condensing apparatus. A complete line of high vacuum condensing machinery consisting of surface and jet condensers, centrifugal and air pumps, cooling towers, etc., will be handled.

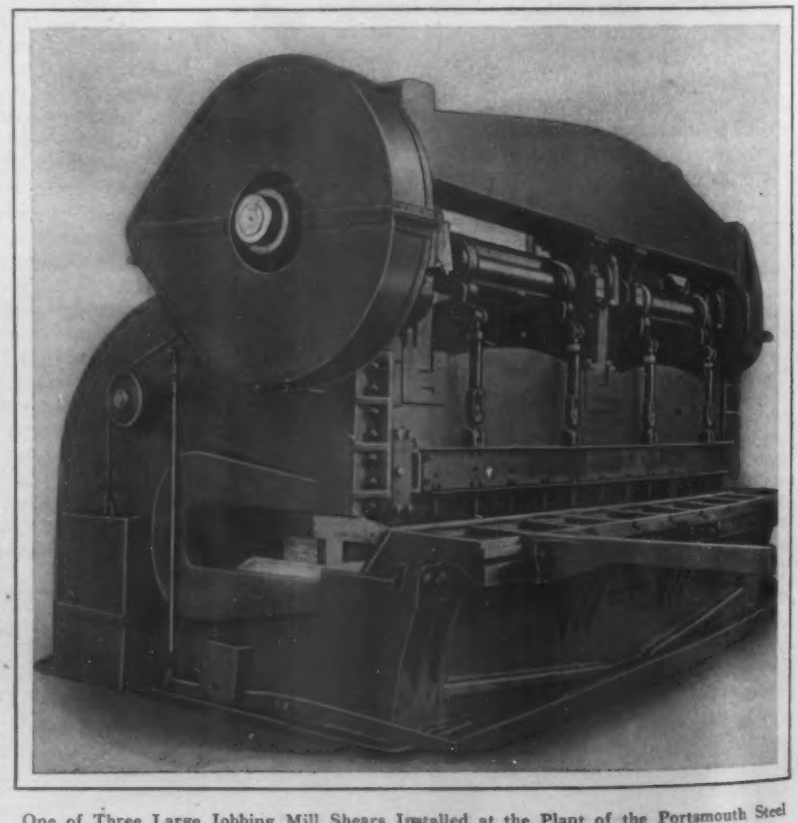
Bids on contract No. 105 for the construction of five steel bridges over the Erie Canal between Buffalo and Rochester were opened April 9 by the Board of Public Works, Duncan W. Peck, superintendent, Albany, N. Y. Skene & Richmond, Louisa, Ky., were low bidders at $258,710. Bids are now being received by Col. J. G. Warren, United States engineer for the Buffalo district, Federal Building, Buffalo, to be opened May 20, for a steel lift bridge 215 ft. in length between abutments, with a width of 50 ft. to be erected at the foot of Ferry street, Buffalo, across the United States ship canal at the entrance to Black Rock Harbor. The estimated cost of this bridge is $100,000.

Jobbing Mill Gate Shears

Three jobbing mill shears installed at the plant of the Portsmouth Steel Company, Portsmouth, Ohio, which were illustrated in *The Iron Age*, March 28, 1912, in connection with a description of the plant are of interest on account of the great length of the shear blade, which is 13 ft. They are used for squaring sheets. The accompanying engraving shows one of the two large shears as it appeared before shipment in the builders' shop, that of the Covington Machine Company, Covington, Va.

As will be noticed the housings and main castings, which are of massive design, are semi-steel. The crank shafts are turned from hammered steel forgings. The clutches and gears are of steel, the teeth of the latter being cut from the solid, while the main clutch gears have removable faces. The clutch mechanisms are arranged to stop the cutter bars at the top of the stroke. Cams on the crank shaft operate the pneumatic clamps which hold the sheet securely in position while the shearing operation is being performed.

Careful attention has been given to the question of protecting the workmen from injury. Gears and flywheels are protected by a guard and the cutter bar counterweights are all hung close to the floor. Each shear is driven by a 15-hp. General Electric motor through a flexible coupling to the first shaft. The flywheel which is carried on this shaft is of small diameter on account of the high speed at which it operates, and in this way the head room occupied by the machine is reduced to a minimum. Two of the shears have 36-in. gaps and will split any length of ⅜-in. plate 72 in. wide, while the third has a gap of 18 in. and a capacity for splitting any length of ⅝ by 36 in. plate. The shear blades in all three machines are 13 ft. long.



One of Three Large Jobbing Mill Shears Installed at the Plant of the Portsmouth Steel Company by the Covington Machine Company, Covington, Va.

Why the Titanic Struck the Iceberg Sideways

BY SIDNEY GRAVES KOON, M. M. E.

To many who have stood on the deck of a ship, watching her turn in a narrow circle, it has appeared as if the entire vessel were turning about a pivoting point near the bow. Very few ever stopped to inquire, however, why this is so. The subject has now been brought up with startling force by the disaster to the Titanic. The ship hit the iceberg sideways, and a gaping hole was ripped out at her weakest point, sending her to the bottom in about four hours.

The iceberg was sighted at a distance estimated to have been a quarter of a mile. A ship traveling at 21 knots will cover that space in about 38 sec. As the length of the ship herself, 882 ft., was two-thirds of the distance at which the obstruction was sighted, the closeness becomes more apparent. The helmsman attempted to change her course enough to clear the iceberg. He succeeded, unfortunately, in substituting a "side-swipe" for a head-on collision, and thereby lost the ship and over 1600 lives. How did this happen?

When the helm of a ship is thrown over two forces set to work, the resultant determining the motion of the ship. The inertia of the moving mass tends to carry her straight ahead. The force of the water rushing against her rudder, held at an angle, tends to throw the stern around and forces a change in direction. The original straight path becomes first a spiral, and then the arc of a circle. All this time the thrust acts on the rudder to

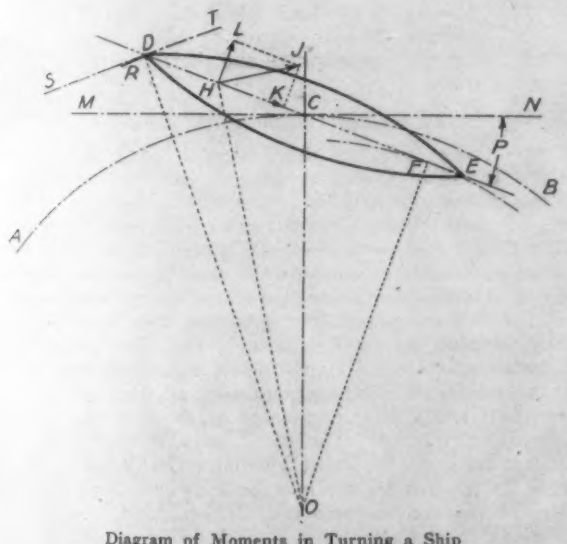


Diagram of Moments in Turning a Ship

such effect as to throw the stern far outside the circle followed by the bow in turning. In other words, the ship takes on something of a "sideways" movement, in which the stern moves much faster than the bow. The greater the speed the greater will this tendency be.

This is best explained by reference to the diagram. If *DE* represents the ship, with her center of gravity at *C*, and center of turning circle at *O*, then the arc *ACB* will indicate the circular path of *C* as the ship turns. The line *R* is the rudder. The path in which, momentarily, *C* is traveling, is *MN* perpendicular to *OC* at *C*. Then *P* is known as the "drift angle" at the point *C*. At the point *F*, the foot of a perpendicular from *O* upon *DE*, there is no drift angle, because here the tangent to the arc of motion coincides with the center line of the ship. Similarly, at the stern *D*, the drift angle, set off by tangent *ST* and the ship's axis, is very large.

The motion of any point in the ship is instantaneously in the direction of the tangent to the circle in which that point is turning. At *F* this tangent is the center line of the ship, and *F* is moving in the same direction, relative to the axis of the ship, as when in a straight course. The motion at any other point *H*, such as represented by *HJ*, may be resolved into two components, *HK* in the direction of the ship's axis, and *HL* in an athwartship direction. These components will also, by the use of suitable constants, represent velocities. It follows from the diagram that, for the point in question, the athwartship or sidewise motion is about 50 per cent. of the fore-and-aft motion. At the stern this percentage reaches a maximum.

Three elements here enter to check the speed of the ship: the great resistance of the water to the sidewise motion, the fact that the thrust of the propellers is delivered in a direction oblique to the motion of the ship, and the drag of the rudder, with the column of water acting upon it. Sometimes this checking is very sharp. It is probably true that the speed of the Titanic was brought down from 21 knots to 18 knots or less by the operation of these elements of resistance. But she could better have withstood a blow at 21 knots head on, where she was especially strengthened to meet it, than a blow at 8 or 10 knots against her weak side, with its single shell.

The helmsman cannot, of course, be censured for acting on his best judgment; but the results of the exercise of that judgment are appalling.

Is This a Guess or a Prophecy?

An equipment official is quoted in the Wall Street Journal as holding the opinion that the present improvement in the equipment market isn't a circumstance to the gain which will be shown when real buying sets in. Authoritative figures give total freight cars built 300,000 five years ago, 182,000 in 1910 and only 72,000 last year. The head of an equipment company says that within 12 months railroads should order 500,000 cars.

"Will these be ordered right away?" he was asked, to which he replied: "I hardly think so. The Interstate Commerce Commission and the public must be taught a lesson. Higher wages without an advance in rates prevented railroads from buying equipment which they would have been glad to use. They realize that the only way to get better rates from the commission is to make such a showing that it will hit the individual pocketbook. That's the way you get results from the public departments. The opportunity for this demonstration will come this fall. A normal crop, to say nothing of prospects of larger crops than ever, will bring so much traffic that roads with only sufficient cars to handle merchandise freight will have the problem of moving grain. The grain will be moved, even if congestion results, and such a howl will come from shippers in all parts of the country that the Commerce Commission will have to pay heed to any measure to relieve the situation. Mark my words, congestion is inevitable."

What is called the largest crane in the world in having 200 tons lifting capacity in connection with a large working radius has been supplied by Cowans, Sheldon & Co., Ltd., Carlisle, Eng., to the Japanese Navy for the Kure dockyard. The crane was recently illustrated in Engineering and is of the revolving electrically operated cantilever type designed to lift 200 tons at 105 ft. radius, 100 tons at 150 ft. radius and 30 tons at 160 ft. radius. The highest loads may be lifted 5 ft. per minute and the traversing speed of the crane is 30 ft. per minute with 200 tons and 60 ft. per minute with 100 tons. It makes a revolution in 8 min. with the heavier load and in 6 min. with the lighter loads.

Within the past 12 months the John Wood Mfg. Company, Conshocken, Pa., has enlarged its special tank department and is devoting time and attention to the development of this line. Both the electric and the oxy-acetylene processes of welding are employed by the company in the manufacture of tanks and containers of all kinds. This company maintains an engineering department, the services of which are at the disposal of purchasers of special containers. Its functions are those of designers and cost specialists, and in a number of cases designs of special containers submitted to them have been modified so as to secure better results and a reduction in the cost of production.

The hydroelectric plant of the Federal Light & Traction Company of New York, to be built on the White River in Taney County, Missouri, is expected to be ready for the transmission of current by November 1. Arrangements are under way to supply all the southwestern part of Missouri, the total horsepower being estimated in excess of 25,000.

To Supplement the Sherman Anti-Trust Act

Henry R. Towne Advocates the Canadian Combines Investigation Act as a Pattern— Types of Combinations to Be Conserved

Important action on the Sherman anti-trust act was taken recently by the Merchants' Association of New York in the adoption of a memorial to Congress. This recites that it is most desirable that Congress without impairing and perhaps without amending the Sherman act should enact new legislation supplementing it. How such relief may be obtained is outlined in a brief paper by Henry R. Towne, president of the Merchants' Association, which is made part of the association's memorial. Mr. Towne's argument is characterized by the vigorous thought he has put into a number of similar discussions of important commercial and industrial questions. He says that the Sherman anti-trust law of July 2, 1890, is clearly one of the factors now adversely influencing the industries and commerce of the country. He emphasizes the point that in the general condemnation of the abuses which appear in the application of the co-operative principle its many good effects have been obscured and often ignored. Then, taking up the different classes of combinations, apart from "those which are bad or which are of dubious usefulness and legality," Mr. Towne discusses them as follows:

The Various Modes of Cooperative Effort

1. Good (and unqualifiedly legal). Exchanges, boards of trade and similar local organizations, intended to provide their members with trade information more quickly and effectively than if such data were gathered by each member individually, thereby facilitating the exchange of commodities, and promoting uniformity and stability in prices. Such organizations have no agreements for the control of prices.

2. Useful (and possibly legal). Trade associations of producers or distributors in one or more specified fields, which furnish to their members credit ratings, wages data, and other useful information; which discuss and determine the allowances which it is proper or expedient to make to customers for cash settlements, for packing or casing, for freight, etc., in order thereby to promote uniformity of practice, and to eliminate competition based on misinformation; and which serve to establish and maintain friendly relations among their members by the holding of meetings for the discussion of matters of common interest.

3. Effective (but of uncertain legality at present). Trade associations which, in addition to the functions enumerated in the preceding paragraph, discuss and regulate prices, in order to protect their weaker members, to prevent ultimate monopoly, partial or complete, by the absorption or suppression of the weaker by the stronger members, and to assure to all the members a fair living profit; and yet which do not and cannot control the market, because the latter is practically controlled by influences beyond the sphere and scope of the association, or because, outside of the latter, there is such substantial part of the industry as to preclude effective control by those who are affiliated in the organization.

4. Fully effective (but clearly illegal as the law is now construed). Trade associations which, in addition to the functions indicated in the two preceding paragraphs, go still further by maintaining effective control of prices in a given trade or territory. Even such associations may do good to an extent which justifies their existence economically. While maintaining a qualified monopoly, they tend to prevent a greater or absolute monopoly by promoting the activity and continuance of the smaller members, who otherwise would be absorbed or crushed by their stronger competitors, under a competition carried to the point of "the survival of the fittest." They favor the realization of profits sufficient to induce producers to aim for quality as well as for cheapness, whereas "war to the knife" implies the opposite, the sacrifice of quality in the struggle for cheapness. Especially, they stimulate the growth of the smaller competitors by supplying from profits the capital needed for growth and development, which otherwise might not be obtainable. The big corporation may provide new capital by new issues of securities, but the small one, as a rule, can only provide it out of surplus profits. Indirectly, they help wage earners by promoting conditions, which do not force the employer toward the "sweating" policy, but permit him to adjust wages on more liberal lines. And finally, they not only do not prevent new competition, but rather promote it by maintaining attractive trade conditions, the benefit of which will be shared by any others engaging in the same field, and they exercise no compulsory influence on the buying public, because in most cases the product concerned is not an essential or a necessity of life, and because substitutes for it are available to all.

The Sherman Act's Defects

The defect of the Sherman act, the argument continues, is that it condemns all "restraints" of trade, whether good or bad in their effect. The defect of the common law is that in like manner it forbids "monopoly" by combination in any form, again without regard to effects. Neither law fits present conditions; both were framed under conditions largely passed or passing. Among the effects produced by the prevailing uncertainty as to the law in its relations to business the following are cited: It tends

1. To curtail both demand and production.
2. To arrest the growth and expansion of existing enterprises.
3. To postpone new undertakings, because of the uncertainty of their results.
4. To keep vast amounts of capital idle.
5. To depress profits and therefore wages.
6. To reduce the employment of labor.
7. To curtail consumption, and thereby further to depress all trade.

The Canadian Combines Act a Pattern

Mr. Towne suggests the enactment of a law similar to the Canadian Combines Investigation Act of May 4, 1910, which would have the effect, 1, of permitting certain acts of partial restraint and monopoly until some one objects, and 2, of eliminating retroactive punishment. The Canadian law is commended in that it provides for a speedy investigation in any case where six or more citizens unite in demanding such investigation, also for full publicity as to all the facts so brought out. In every case a commission is created consisting of a member nominated by the parties complainant, one nominated by the parties defendant and a third nominated by the first two, all appointed by a court. The commission reports upon the facts, whereupon the court announces its decision. It is argued that such an act may be passed without altering or amending the Sherman law. The argument then continues as follows:

The proper function of the law is not to define what may be done, but what may not be done. All else, in this free land of ours, is permissible to any citizen. The defects of the Sherman act are:

1. That it prohibits co-operation among competitors in terms so vague and general as to be destructive.
2. That it contains no rule for the guidance either of the public or the courts; no basis for determining how or where the line shall be drawn between what is good and permissible and what is bad and forbidden; and no provision for retaining and encouraging co-operation which is not contrary to public policy but beneficent or harmless.
3. Above all that, while thus affording no sure rule of conduct for those who desire industrial or commercial amity and peace in place of destructive competition, it holds suspended over their heads, like a sword of Damocles, the threat of drastic punishment for any violation of its terms at any time in the future, however remote or long deferred, when it may suit the pleasure of the Department of Justice to bring the matter to issue.

If the purpose were to hamper and harass the business interests of the country, could any device be invented or conceived more perfectly, more cruelly, effective for that purpose than this? Is it surprising that business indignantly protests, and meantime languishes? Is it not incumbent on Congress, in the interest of all the people, now, before the close of its present session, to enact an amendatory act which, while preserving all that is essential and good in the intent of the Sherman Act, or perhaps even leaving that act intact, shall clear up and remove

its present demonstrated uncertainty, shall afford a clear and intelligent rule of conduct for those who desire to respect it and yet not wholly to forego the manifold benefits of co-operative effort, and which shall, above all, provide that unwitting and honest violations of the law, arising from its unavoidable uncertainty, shall carry no retroactive punishment, but shall only involve a penalty if persisted in or continued after the illegality of the specific act has judicially been determined?

Our neighbors of the Dominion of Canada, confronted with substantially the same problem—the same conditions of industry, commerce and transportation—have devised and adopted a law which fulfills these conditions. Why should we not study it, and if found effective adopt it, or improve on it if we can? If that law has as yet only been availed of in a few cases, it is fair to remember that it is less than two years old, and also to point out that its mere existence may tend to obviate the need of applying it, to eliminate the evil it is designed to prevent. Certain it is that forms of co-operation which in the past have been practiced here with benefit to all concerned, but which now are largely or wholly abandoned, continue to flourish in Canada without protest or objection, although the Canadian "Combines Investigation Act" provides the means and makes it easy for anyone who believes them injurious and contrary to public policy to bring them to bar. And so we have afforded to us the unusual opportunity of studying the manner in which the problem we are trying to solve has partially, if not completely, been solved by another community, closely similar to our own; of learning in advance the probable results which would follow our adoption of a similar law; and of incorporating in our law any improvements or additions suggested by Canadian experience thus far.

An 8-Hour Blast Furnace Day

With Seven Work Days to the Week

The New Plan Adopted by the Cambria Steel Company—Cost Not Increased

The announcement made by the Cambria Steel Company, of Johnstown, Pa., that beginning on May 1 it would gradually put its blast furnace labor on an 8-hour basis is of great interest to the entire iron trades; but from the comments made in the daily press and elsewhere, it is evident the matter is much misunderstood and needs explanation. For this reason, C. S. Price, president of the company, has issued the following statement regarding the new arrangement:

President Price's Statement

"The trial of the 8-hour day at its blast furnace department by the Cambria Steel Company has gained such prominence in the papers as to require an explanation to correct some misunderstanding.

"The Cambria Steel Company has been known for years as an 8-hour plant, owing to the fact that it has had a large percentage of its mill operations on an eight-hour basis—in fact, at every point at which that system could be economically and efficiently applied. For years the matter has been periodically taken up of applying it to the blast furnace department, but conditions here, as elsewhere, were adverse, owing to the increased number of men and the expense involved, unless there was a material reduction in wages.

"When the six-day basis was introduced at a number of blast furnaces last year, by reducing the working hours from 84 to 72 hours per week, in compelling each man to 'lay off' one day of 12 hours per week, the Cambria people saw an opportunity to try the 8-hour plan so largely used in other departments of the works, and worked up a schedule on that basis. The men preferred seven 8-hour days, with fewer men per turn, which would be a practical offset to the 72-hour basis. This was submitted on November last and, after careful consideration during the winter, will be given a gradual tentative trial, both for conservative reasons and, of necessity, because additional men will be needed, which may require a long time to obtain. The choosing of this time to make a limited start was because of the approach of the summer or heated term.

"Nothing revolutionary will be undertaken. It has no connection whatever with any agitation that has been current for several years, but is simply a works detail of the management of the Cambria Steel Company in further development along lines well-established for many years."

The Six-Day 72-Hour Week Not Approved

Supplementing the above, it may be said that the movement started last year by a number of the leading steel companies and pig iron producers in changing the hours of labor at blast furnaces and steel works from seven days per week of 12 hours per day to six 12-hour days per week, which meant an average reduction in wages of about 14 per cent. to the men, did not appeal to the Cambria management; it did not believe this was the best solution of the problem and therefore did not adopt it. In fact, the Cambria company has always been a warm advocate of the 8-hour day for its men, and as far back as 1884 operated some of its finishing mills on an 8-hour turn and is doing so to-day. Last year during the slump the 12-hour turn was restored on one of its mills, and this was done on the request of the men who wanted larger earnings than they could get on the 8-hour turn, the mills not being operated to full capacity. Instead of adopting the 6-day 12-hour turn, the company set about to find out whether it would not be feasible to put its blast furnace labor on an 8-hour basis of seven days per week, and at a reduction in wages that would be no greater to the men than would have been the case had it adopted the 6-day week with the 12-hour day. After months of careful study, frequent consultations with all classes of labor at its blast furnaces, and a practical test of the plan made recently, the management believes it has worked out this difficult problem and in a short time expects to have all its eight blast furnaces on an 8-hour basis of 7 days per week. The new plan was worked out much in this way:

Details of the New Eight-Hour Plan

Taking the case of a blast furnace workman who at present is paid 20 cents per hour for his labor and who works 84 hours per week, his earnings are $16.80 per week. Had the company adopted the 6-day 12-hour schedule, this man's pay would have been reduced from $16.80 per week to $14.40, or a little over 14 per cent. In making up its new plan, the company figured entirely on the $16.80 basis per week and after taking up individually the case of each man employed at its furnaces, no matter what the class of his labor was, it was found that by increasing its force of men by only one-seventh in number it could turn out as much pig iron and of as good quality as would have been the case had it adopted the 6-day 12-hour plan, and at no greater cost. This additional number of men would have been required to establish the 6-day 12-hour arrangement now in vogue at other works. In other words, the men as a whole accept the reduction of $2.40 per week each under the new arrangement—this figure being used as a basis unit only—and at the same time each can earn just as much money as he would have earned under the 6-day 12-hour plan. This unit of $2.40 per week, it has been carefully figured out, will pay the wages of one-seventh more employees at the blast furnaces of the Cambria Steel Company. Thus the company has not increased its cost of making pig iron, the earnings of the men will be as large as they would have been had the company adopted last year the 6-day 12-hour plan, and the men are on the basis of an 8-hour day and a 7-day week.

Quite a number of the employees have already expressed personally to the management their gratification that the change is to be made to the 8-hour turn for 7 days rather than to the 12-hour turn for 6 days, and promise even greater efficiency in every way than they were able to give when working the long stretch of 12 hours per day 7 days a week. The company will require no more men when the 8-hour day is in effect at all of its eight furnaces, as stated above, than it would have required had it adopted the 72-hour week basis, to displace the present scheme of 84 hours per week. It is planned to start the new arrangement at one or two furnaces first and increase the number as fast as the additional men can be obtained. Owing to the great scarcity of labor at all iron and steel plants at present, it may be some little time before the new schedule is effective at all the furnaces; but it is planned now to start the new working hours with the men employed in the engine rooms in the blast furnaces and gradually extend it to all other blast furnace labor.

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More Steel than Pig Iron in 1911

The statistics of steel production in the United States in 1911, which have just been compiled, show a relation between pig iron output and steel output which is altogether without precedent in this or any other country. The production of steel was greater than that of pig iron. In no previous year since the country made as much as 1,500,000 tons of pig iron had the total of steel ingots and castings come within 1,200,000 tons of that for pig iron. Last year the production of steel ingots and direct castings was 23,675,501 gross tons, while that of pig iron was 23,649,344 tons, the excess of the former being 26,157 tons. On the face of things it would seem that, with the decreasing percentage of scrap used in steel making in recent years, and with the large consumption of pig iron by gray iron and malleable foundries, by pipe works and puddling mills, there must be an unusual combination of conditions to give a greater yield of steel than of pig iron.

One factor tending to such a result would be the using up by steel works in any year of a considerable amount of pig iron drawn from stocks existing at the beginning of the year. Another factor would be a business condition in which new construction and additions in metal working lines were small, and hence little call upon the products of the foundry, with consequent restriction of the production of pig iron other than for steel making. A third factor would be so low a level of pig iron prices as to restrict greatly the operation of furnaces making iron for the market. A fourth would be such an abundance of scrap at very low prices as favored its use in open hearth furnaces, somewhat to the displacement of pig iron. All of these four conditions existed together in 1911, with the result that for the first time in the history of the industry the products of the converter, the open hearth furnaces, the crucible and the electric furnace exceed those of the blast furnace.

The table below shows the relation between pig iron production and that of steel ingots and castings in 1911 and a number of preceding years:

Production of Pig Iron and of Steel Ingots and Castings—Gross Tons.

	Pig Iron.	Steel Ingots and Castings.	Excess of Pig Iron.
1900	13,789,242	10,188,329	3,600,913
1905	22,992,380	20,023,947	2,968,433
1906	25,307,191	23,398,136	1,909,055
1907	25,781,361	23,362,594	2,418,767
1908	15,936,018	14,023,247	1,912,771
1909	25,795,471	23,955,021	1,840,450
1910	27,303,567	26,094,919	1,208,648
1911	23,649,344	23,675,501	26,157*

*Excess of steel.

The contrast between 1900 and 1911 in the above table is very marked. As bearing on two of the four considerations cited above in explanation of the excess of steel production over pig iron production in 1911 these facts may be cited: All steel companies, it is known, drew upon their stocks of pig iron in 1911. Further, the production of basic pig iron last year was 58 per cent of the production of basic open hearth steel, whereas in 1910 it was 59.4 per cent, and in 1909 it was 61.5 per cent. This difference may indicate both the increased purchase of low priced scrap last year and a considerable use of cold pig iron from stock produced in 1910.

Apart from the special conditions in 1911 above referred to, a general consideration in the narrowing of the gap between pig iron output and steel output

in the past decade is this: In the large volume our steel ingot production has reached in very recent years is a considerable percentage of metal that is weighed and reported as ingots, but is constantly making the circuit from the shear to the melting furnace and back again and thus never counts in the statistics of finished steel products.

British Exports and the Coal Strike

Reports during the past six weeks of the British iron and steel industry being paralyzed by the coal strike are not substantiated by the Board of Trade returns of exports in March. The strike was in full swing at the beginning of March, the British government announcing on that date that 1,049,407 men and boys had gone out, and it was settled early this month. British exports of iron and steel in March were larger than in either of the two preceding months of the year, and were also much larger than in March, 1911. The March exports of pig iron, ferromanganese, spiegeleisen and ferrosilicon were 34 per cent. greater than the average of the two preceding months, while the exports of all other iron and steel, including scrap, billets, finished rolled steel, etc., showed an increase of 27 per cent. Comparing March, 1911, with March, 1912, there was an increase of 76 per cent. in pig iron, etc., and of 16 per cent. in all other iron and steel, the increase in the total of all such commodities being 30 per cent. The tonnages in detail are shown in the following table:

British Iron and Steel Exports, Gross Tons

	Pig Iron, etc.		All Other.	
	1911.	1912.	1911.	1912.
January	80,905	105,159	315,552	344,744
February	56,372	137,277	277,615	210,577
March	92,459	162,687	305,987	354,077
Three months	229,736	405,123	899,154	909,398

There is reason to surmise that buyers exerted particular pressure to secure shipment, in expectation of the coal strike, and that shipments were made largely from stock. Why such shipments were not large in February, rather than in March, is difficult to explain, if such influences existed. The returns for April will give a clearer view of the situation. Inasmuch as the iron and steel products which make up the figures cited are chiefly materials utilized for further manufacturing, involving as a rule the use of fuel, it may be concluded that the demand from English consumers was less urgent than usual, permitting the available material to be diverted for foreign shipment.

In the United States there has been a scarcity of ferromanganese for several weeks, which has been attributed in most quarters to the coal strike. Unfortunately, while the Board of Trade returns show the exports of ordinary pig iron by countries, they do not similarly distribute the returns for ferromanganese. The exports to the United States of pig iron alone amounted to 10,588 tons in March, against an average of 6,000 tons a month in the two preceding months, and an average of 10,000 tons a month in the first three months of 1911. The exports of ferromanganese, spiegeleisen and ferrosilicon (included under "pig iron, etc.") in the foregoing table, were as follows, gross tons:

	1911.	1912.
January	11,439	9,898
February	6,206	6,998
March	8,701	13,830
Three months	26,346	30,726

From this table it will be seen that these exports have been very large, though as three classes of material are included in the figures, and they refer to exports to all countries any statement as regards British ferromanganese exports to the United States would be the merest guess. A rough estimate of our normal requirements of ferromanganese can readily be made In the three fiscal years ended June 30, 1911, we imported 277,426 tons, the imports varying according to the activity in our steel industry, and in the same period we made 73,782,848 tons of pig iron, showing 3,750 tons of ferromanganese imported for every million tons of pig iron we made, from which it may be inferred that our import requirements would have ranged from 7,500 to 9,000 tons a month during the past three months. This estimate is entitled to considerable respect, but there are no data available for discussing the fact that it closely approximates the total British exports of ferromanganese, spiegeleisen and ferrosilicon to all countries in the past three months. That Great Britain furnishes a large part of the ferromanganese coming to the United States is well known, however, and statistical confirmation is found in the figures for ferromanganese imports at Baltimore, showing that Great Britain contributed 47,317 tons out of 49,319 in the calendar year 1909; 45,984 tons out of 54,256 in 1910, and 41,285 tons out of 41,939 in 1911.

It is worthy of note, irrespective of influences which may have arisen from the coal strike, that British iron and steel exports in the past three months have been very large. The total, including scrap, pig iron, rolled material, etc., but no machinery, was 1,314,521 tons, or at the rate of 5,250,000 tons annually. The exports for full calendar years have been as follows:

	Gross Tons.		Gross Tons.
1905	3,721,382	1909	4,373,381
1906	4,682,200	1910	4,735,734
1907	5,166,366	1911	4,664,772
1908	4,229,508		

While British iron and steel exports have not reflected the coal strike, British coal exports do, as shown by the following statistics, the figures not including bunker coal for foreign trade:

British Coal Exports, Tons:

	1911.	1912.
January	4,956,215	5,421,175
February	4,886,429	5,514,984
March	5,358,708	1,536,913
Three months	15,201,352	12,473,072

The normal exports, it will be seen, are a trifle over 5,000,000 tons a month, while the exports last month were only 30 per cent. of this quantity.

The Stanley Committee Ends Its Public Hearings

The special committee of the House of Representatives investigating the United States Steel Corporation, of which Congressman A. O. Stanley is chairman, concluded its labors in the examination of witnesses April 13. The resolution for the appointment of the committee was adopted by the House May 16, 1911, and it began its work June 1 by examining the late John W. Gates in regard to the acquisition of the Tennessee Coal, Iron & Railroad Company. In due time the report of the committee will be made public. It has taken an enormous amount of testimony, the scope of its inquiry having been so broad as to cover practically every department of the corporation's activities, and if the

whole of the proceedings should be published it would fill volumes. The iron trade will await with interest not merely the report of the committee but the result of the efforts of Chairman Stanley and his confrères in attempting to digest the information which has been collected from so many sources.

The task of properly weighing this information and presenting intelligently the conclusions to be drawn therefrom is a gigantic one. It is assumed that the report will be made before the expiration of the present session of Congress, in view of the fact that the investigation has had a political trend and that the conclusions of the committee may be desired for campaign purposes in the contest for the Presidency and for control of the next Congress to take place this fall.

The proceedings of this committee have been the subject of criticism from the beginning of the inquiry. The investigation has not been conducted according to strict rules of procedure such as would obtain in a court of justice. Testimony has been received and permitted to go in the record which would not be permitted in judicial proceedings instituted for the purpose of bringing out only facts and therefore suppressing statements based simply on guesses or hearsay. It was well remarked in the committee room during the course of the investigation that "everything goes before this committee." Most extravagant statements were allowed to go out to the country from witnesses who appeared to have been called for the sole purpose of creating prejudice against the United States Steel Corporation and its methods in the minds of the public. Efforts were made of course by the legal representatives of the corporation who were present at the hearings to have these statements corrected and to have the exact facts presented, but it frequently happened that the original statements, when of a sensational character, were given wide circulation, while the corrections came so long after as to lose their force or were published in such a way as to be deprived of their proper effect.

It is exceedingly difficult to see what benefit has been obtained by the labors of this committee. It is probably true that the public now knows more regarding the United States Steel Corporation and its ramifications than before the committee's investigation was started. Much will depend upon the methods employed in digesting this testimony by the committee as to whether the corporation will be placed before the public fairly. The committee was apparently organized for the purpose of convicting the Steel Corporation of improper methods, but perhaps a minority report may be presented which will help to put the case of the Steel Corporation in its proper light.

It is being claimed that the investigation has been productive of at least one good result, which is the development of much substantial testimony to the effect that the United States Steel Corporation has by no means been in possession at any time of so large a part of the ore deposits of this country as to constitute a monopoly. The majority of the committee apparently started out with the intention to prove that the corporation controlled so large a share of the available ore as to make it far overshadow all other manufacturers of iron and steel. This was demonstrated in the early part of the inquiry when an effort was made to show that by the acquisition of the properties of the Tennessee Coal, Iron & Railroad Company it had secured the principal part of the iron ore deposits of the South. The testimony brought out before the committee has clearly indicated that the corporation is not only in possession of much less than half of the Southern iron ore deposits but that there are also great areas of iron ore lands in the North which are outside of its control. This, however, had already been known in the iron trade, so that the developments brought out by the committee were not new. Even in this respect its labors have not by any means justified the cost of the investigation.

Ansonia Brass & Copper Offices Go to Ansonia

The main office of the Ansonia Brass & Copper Branch of the American Brass Company, at 99 John street, New York, will be removed April 27 to Ansonia, Conn. In an announcement to its customers the company explains that the change is made to facilitate business and to bring them into closer touch with its manufacturing departments. It is requested that after the date of removal all communications be addressed to the American Brass Company, the Ansonia Brass & Copper Branch, Ansonia, Conn. An office will be continued at 99 John street, but it will be restricted to use as a branch sales office for the New York territory. It will be connected by private telephone with the main office in Ansonia. Every department of the company will be conducted from Ansonia. Among the advantages to be derived from the change will be a saving in time in filling orders and the avoidance of a duplication in clerical work. The change necessitates the transfer of some of the company's employees and department heads to Ansonia, among them J. J. Lockwood.

Association of American Steel Manufacturers

The annual meeting of the Association of American Steel Manufacturers was held April 20 at the Marlborough-Blenheim, Atlantic City, N. J., and was attended by representatives of most of the 32 steel companies composing the membership. The sessions were occupied chiefly in preliminary work on proposed additions to the Manufacturers' Standard Specifications, and to a review of specifications already in force, with special reference to amendments that had been suggested. None of the matters discussed have as yet reached their final form and hence no announcement concerning them is made by the association at this time. The officers, all of whom were reelected, are as follows: President, A. A. Stevenson, vice-president Standard Steel Works Company, Philadelphia; vice-president, P. E. Carhart, inspecting engineer Illinois Steel Company, Chicago; secretary-treasurer, Jesse J. Shuman, inspecting engineer Jones & Laughlin Steel Company, Pittsburgh.

At the annual meeting of the Manufacturers' Bureau of Indiana at Indianapolis April 20, the officers were reelected as follows: President, Melville W. Mix, Mishawaka; first vice-president, B. A. Van Winkle, Hartford City; second vice-president, Henry C. Atkins, Indianapolis; treasurer, Chapin C. Foster, Indianapolis; executive committee, W. H. Morsches, Anderson; Charles H. Campbell, Shelbyville; H. G. Niles, South Bend; Edward H. Dean, Indianapolis. The secretary is appointed by the executive committee. The bureau has 800 members. At the annual banquet, following the business session, the chief addresses were by Lee Galloway, New York, on "Shop Efficiency," and by James E. Emery, Washington, chief counsel of the National Association of Manufacturers, and by Walter Drew, counsel for the National Erectors' Association.

The referendum vote of the bituminous fields of the United Mine Workers of America on the Cleveland agreement between representatives of the miners and operators resulted in a ratification of the contract by a vote of 109,709 to 32,139, as announced from the miners' headquarters in Indianapolis. This means peace in the bituminous fields until March 31, 1914, with miners obtaining 5 cents, 4 cents and 3 cents more a ton, according to the class of coal mined, and an advance of 5.26 per cent. on other work. It is expected that all the miners in the 19 districts will be at work again by May 1.

Scandinavian Iron Ores

The Supply to Be Considerably Increased by New Development and Further Outlays

The great iron mining and concentrating works of the Sydvaranger Actiebolaget, of North Norway, described in *The Iron Age* of March 9, 1911, page 608, are to be extensively increased at once, with a view to making an annual product of not far from 1,000,000 metric tons of high-grade 65 per cent. fine concentrates and briquettes. According to calculations and investigations that have but now been completed by the company, it will be possible, by the investment of 11,000,000 kronor ($2,970,000) to raise the annual output to the desired amount. Of this sum already 3,000,000 kr. has been advanced by a syndicate led by the Norrlands Banken of Stockholm, and a Hamburg bank, and this amount is now being expended. It is being used for the erection of additional Gröndal separator and concentration capacity, additional briquette furnaces of the Gröndal type, and additional machinery, steam shovels and coarse crushers. The last named are of a capacity for taking pieces of hard ore as large as can be handled by the steam shovels and reducing them to 2.5 to 3-in. size.

A Billion Tons of Ore Now Located

Recent additional explorations underground by drilling have increased the ore expectations of the company from the previous total of some 450,000,000 tons to considerably more than 1,000,000,000 tons, sufficient to insure a total yield of concentrates of about 500,000,000 tons, based on the present proportion of 2.3 tons into 1. The raw ore is of about 36 to 37 per cent. iron and the concentrates shipped of late have averaged 65 per cent. In 1911 the exports were 100,000 metric tons, of which half was fine concentrates, the rest briquettes. This was exported to Germany and England, the former country taking all the fine concentrates and a part of the briquettes. For the present year the company has contracted the shipment of 300,000 tons, of which two-thirds is fine concentrates. It is probable that this total will be increased by later sales. For the following year the company has already sold 500,000 tons, half in briquette form.

Up to date there has been invested in the enterprise a total of 27,000,000 kr. ($7,300,000) and it is estimated that the sale of 500,000 tons a year will yield interest on the investment. The 3,000,000 kr. now being invested is included in this capitalization, and will bring the yield to the 500,000 tons mentioned.

Shipments from the export fields of Sweden during the year 1911 were as follows:

Kirunavaara, via Narvik, 2,170,000 metric tons:

Gellivara, via Lulea, 1,184,000 metric tons.

Of this total quantity 211,000 tons from Narvik and 40,000 tons from Lulea came to the United States. Large sales of ore from both Kiruna and Sydvaranger have recently been made to this country.

For the Grangesberg export field of Sweden, including the controlling mines of the district, the total 1911 product was 848,885 tons, of which 639,000 tons was exported, the remainder being used in Sweden. Of the latter 84,500 tons was used in the works of the Domnarfvets Jernfabrik.

A New Dunderland Company

As to the Dunderland iron fields and mining company, of Norway, it is hoped that a resuscitation of the enterprise may soon take place, for the property has been bought by English interests, chiefly those formerly associated with them, but under a new corporation, and the former director of the enterprise is again living at Dunderlandsdalen, arranging details of operation. It will be remembered that this works includes a very large concentrating plant of Edison design, as well as a railroad to the Atlantic, and that it has been closed for some years, pending reorganization and the raising of additional capital.

The Niles-Bement-Pond Company, machine tools, 111 Broadway, New York, announces that its Chicago offices will be removed May 1 from the Commercial National Bank Building to the McCormick Building, 332 South Michigan avenue.

Papers for the Congress of Applied Chemistry

The latest bulletin of the Eighth International Congress of Applied Chemistry to be held in Washington and New York, September 4 to September 13, 1912, contains a list of 196 additional papers promised for the respective sections. The total is now 573. Included in the last list are the following:

"Recent Developments in the Electric Steel Furnace," by Dr. P. Heroult, New York.

"Conditions Which Control the Formation and Nature of Electrolytic Zinc Coatings," by Dr. Alfred Sang, Paris, France.

"Notes on Electrolytic Iron," by Dr. Sherard Cowper-Coles, London, England.

"The Function of Slag in Electric Steel Refining," by Dr. Richard Amberg, Crucible Steel Company of America, Harrison, N. J.

"Certain Characteristics of Iron Corrosion," by Prof. Charles F. Burgess, Madison, Wis.

"A Controlling Device for Electric Furnaces," by Dr. C. B. Thwing, Philadelphia.

"Fuel Economy of the Cupola," by Prof. John J. Porter, University of Cincinnati, Cincinnati, Ohio.

"Some Physical Characteristics of High Speed Tool Steel," by J. A. Mathews, Halcomb Steel Company, Syracuse, N. Y.

"Further Experience with the Gayley Dry Blast," by Edward B. Cook, Warwick Iron & Steel Company, Pottstown, Pa.

"Open Hearth Practice," by R. B. Carnahan, Middletown, Ohio.

"Improvements on Kilns for Briquetting Iron Ores," by Arthur Ramen, Helsingborg, Sweden.

"Modern Manganese Bronze Tests," by W. M. Corse, Lumen Bearing Company, Buffalo, N. Y.

Seattle's Preparation for Enlarged Business

The Publicity Bureau of the New Chamber of Commerce, Seattle, Wash., is energetically pushing the interests of that city. Literature recently issued gives a table prepared by Gen. H. M. Chittenden of the Seattle Port Commission and former Government engineer, which estimates that $20,000,000 is now pledged to be expended for the development of Seattle's' harbor in the next five years. Of this large amount the United States Government is credited with $2,275,000, the remainder of the fund coming from State, county and municipal appropriations. This work is being done for the purpose of enabling the city to take advantage of benefits coming from the opening of the Panama Canal. The funds referred to above include $8,100,000 voted by the Seattle Port District for the acquision of water frontage and the erection of six concrete wharves, 1400 ft. long and 150 ft. wide, accommodating 40 large steamships at one time. Terminal facilities will be provided similar to the Bush Terminals in Brooklyn, N. Y. A New York corporation plans to erect 70 buildings for factories and storage warehouses with every facility for handling raw and finished products.

It is claimed that Seattle offers the cheapest and most attractive supply of electrical power of any city on the Pacific coast. Power is furnished by three large hydroelectric plants operated by private companies and one owned and operated by the city. The developed water power in the vicinity provides nearly 250,000 hp., while it is estimated that 2,500,000 hp. is available for development in the Cascade and Olympic mountains contiguous to Seattle. At an election in March the citizens voted $1,640,000 for the purchase of two power sites to supplement the city power plant. When developed this will add 200,000 hp. to that plant.

Koppers Coke Oven Contract.—The H. Koppers Company, Joliet, Ill., has taken a contract for 70 by-product coke ovens to be built at the plant of the Woodward Iron Company, Woodward, Ala. These ovens will be 13¼ tons capacity and the guaranteed coking time is 15 hours. The same company built the 60 by-product ovens now in operation at Woodward.

The American Institute of Electrical Engineers and the Association of Iron and Steel Electrical Engineers are meeting jointly in Pittsburgh this week, in the Fort Pitt Hotel, the sessions being held under the auspices of the Pittsburgh section of the Industrial Power Committee of the institute. The programme provides for morning and afternoon sessions on Thursday and morning sessions on Friday and Saturday.

The Iron and Metal Markets

A Broader and Stronger Market

Heavy New Car Demand Pending

Tonnage on Steel Company Books Increasing—Large Sales of Pig Iron

The market for pig iron and finished steel products has broadened and strengthened. Events continue to count against the view that the advance movement which began to be well defined about one month ago is only a passing spurt. The position of sellers is undeniably stronger and the indications of a buyer's market are lessening.

Fuller information as to the agricultural buying of steel bars, which was the feature of this report one week ago, indicates that these contracts amount to 300,000 tons, that 1.15c. Pittsburgh, was the basis for the most part, and that many deliveries extend to July 1, 1913. The leading harvester interest was a buyer of 36,000 tons for delivery this year and on this 1.33c., Chicago, equivalent to 1.15c., Pittsburgh, may have been shaded slightly.

The advance of bars to 1.20c. and of plates and structural shapes to 1.25c., Pittsburgh, announced by a number of steel companies in the past week, followed considerable bookings in all three lines at the old prices. That such a move would be so generally participated in would not have been prophesied in the face of conditions existing at the opening of the month. Since then the business on the books of the steel companies has increased in spite of heavy shipments.

Railroad buying is a more pronounced feature of the situation, with all the efforts to minimize its proportions. The scale of impending car contracts is larger than has been reported. The Harriman lines, Atchison, Canadian Pacific, Grand Trunk, Wabash, L. & N., St. Paul and Kanawha inquiries are for a total of 40,000, all of which are likely soon to be placed. Car shops have more than three months' work ahead and some of them are not getting steel as fast as they want it.

Canadian lines have yet to buy 100,000 tons of rails for this year and half of this or more will come to this country, as neither Canadian nor English mills can give the deliveries wanted. The Monon has bought 6000 tons at Chicago.

Plate mills in the Pittsburgh and Chicago districts are falling behind on deliveries, and Eastern mills, which suddenly began running well up to capacity this month, are now holding more nearly to the Pittsburgh basis.

Some cutting on structural material is still noticed in Eastern markets. Large fabricating contracts continue to tempt concessions, the 10,000 tons for the new Brier Hill open hearth plant at Youngstown bringing out a price figuring back close to 1c. at mill for plain material.

The bookings of pipe and tube mills are in excess of shipments. The advance in oil is stimulating line work, and a 40,000-ton contract of this sort is pending.

There is less complaint from the wire trade and reports from Western markets are brighter both as to new sales and specifications.

Reports are mixed as to the establishment of the advances in sheets, but mill operations are above 90 per cent. An event in the roofing sheet trade is the announcement of the leading producer that sales will be made hereafter by weight instead of by the square.

Chicago and Central Western pig iron markets have been active and the tendency of prices is still upward. Sales at Chicago in the past two weeks are put at 150,000 tons, largely to agricultural, malleable and radiator interests. At Buffalo 60,000 tons has been sold, of which 40,000 to 50,000 tons was malleable. In Southern iron $10.75, Birmingham, for No. 2, third quarter delivery, appears to be minimum and $11 for fourth quarter.

In steel making pig iron a 15,000-ton sale of basic at Cincinnati makes a total of 50,000 tons of basic in that market in two weeks. A sale of 6000 tons of Southern basic iron was made for St. Louis delivery, third quarter, at $11.25, Birmingham. In Eastern Pennsylvania some business was put through at $15 delivered, but furnaces there now ask $15.50 for the second half. The Carnegie Steel Company is expected to buy 15,000 to 20,000 tons of Bessemer iron.

Ferromanganese is strong at the advance to $43.50, Baltimore. Small lots have sold at $45 to $50.

Export trade is still expanding, the British coal strike having brought new customers to American mills. On a recent plate order from a Mediterranean shipyard 1.33c., Pittsburgh, was realized, while shipments were still going out on some home contracts as low as 1.10c.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics.

At date, one week, one month and one year previous.

	Apr. 24, 1912.	Apr. 17, 1912.	Mar. 27, 1912.	Apr. 26, 1911.
Pig Iron, Per Gross Ton:				
Foundry No. 2 standard, Philadelphia	$15.00	$15.00	$15.00	$15.50
Foundry No. 2, Valley furnace	13.25	13.25	13.25	13.75
Foundry No. 2, Southern, Cincinnati	13.75	13.75	13.50	14.25
Foundry No. 2, Birmingham, Ala.	10.50	10.50	10.25	11.00
Foundry No. 2, at furnace, Chicago*	14.00	14.00	14.00	15.00
Basic, delivered, eastern Pa.	15.00	15.00	14.50	15.00
Basic, Valley furnace	13.00	13.00	13.00	13.75
Bessemer, Pittsburgh	15.15	15.15	15.15	15.90
Malleable Bessemer, Chicago	14.00	14.00	14.00	15.00
Gray forge, Pittsburgh	13.65	13.65	13.65	14.40
Lake Superior charcoal, Chicago	15.75	15.75	15.75	17.50
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh	20.00	20.00	20.00	23.00
Open-hearth billets, Pittsburgh	20.00	20.00	20.00	23.00
Forging billets, Pittsburgh	27.00	27.00	26.50	28.00
Open hearth billets, Philadelphia	22.40	22.40	22.40	25.40
Wire rods, Pittsburgh	25.00	25.00	25.00	29.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	**16.00**	15.25	15.25	14.25
Iron rails, Philadelphia	15.50	15.50	15.50	17.00
Car wheels, Chicago	13.50	13.50	13.00	13.25
Car wheels, Philadelphia	13.00	13.00	12.50	13.00
Heavy steel scrap, Pittsburgh	**13.25**	13.00	13.00	12.50
Heavy steel scrap, Chicago	**11.75**	11.50	10.75	11.50
Heavy steel scrap, Philadelphia	13.25	13.25	12.00	13.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Finished Iron and Steel.	Apr. 24, 1912.	Apr. 17, 1912.	Mar. 27, 1912.	Apr. 26, 1911.
Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill..	1.25	1.25	1.25	1.25
Iron bars, Philadelphia.....	1.27½	1.27½	1.22½	1.32½
Iron bars, Pittsburgh.....	1.25	1.25	1.22	1.35
Iron bars, Chicago.....	1.15	1.15	1.15	1.25
Steel bars, Pittsburgh.....	**1.20**	1.15	1.10	1.40
Steel bars, tidewater, New York	**1.36**	1.31	1.26	1.56
Tank plates, Pittsburgh.....	**1.25**	1.20	1.15	1.40
Tank plates, tidewater, New York	**1.41**	1.31	1.31	1.56
Beams, Pittsburgh	**1.25**	1.20	1.15	1.40
Beams, tidewater, New York....	**1.36**	1.31	1.31	1.56
Angles, Pittsburgh	**1.25**	1.20	1.15	1.40
Angles, tidewater, New York...	**1.36**	1.31	1.31	1.56
Skelp, grooved steel, Pittsburgh	1.12½	1.12½	1.10	1.30
Skelp, sheared steel, Pittsburgh	1.17½	1.17½	1.15	1.35
Sheets, Nails and Wire,				
Per Pound to Largest Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	**1.90**	1.85	1.80	2.20
Wire rails, Pittsburgh.....	1.60	1.60	1.60	1.80
Cut nails, Pittsburgh.....	1.55	1.55	1.55	1.65
Fence wire, ann'led, 0 to 9, P'gh.	1.40	1.40	1.40	1.60
Barb wire, galv., Pittsburgh....	1.90	1.90	1.90	2.10
Coke, Connellsville,				
Per Net Ton, at Oven:				
Furnace coke, prompt shipment	$2.60	$2.60	$2.25	$1.55
Furnace coke, future delivery..	2.25	2.25	2.25	1.75
Foundry coke, prompt shipment	2.75	2.75	2.75	2.00
Foundry coke, future delivery..	**2.65**	2.50	2.50	2.20
Metals,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	16.00	16.00	15.50	12.37½
Electrolytic copper, New York..	*15.87½*	16.00	15.37½	12.12½
Spelter, St. Louis.....	**6.85**	6.80	6.60	5.30
Spelter, New York.....	**7.00**	6.95	6.75	5.50
Lead, St. Louis.....	4.12½	4.12½	4.12½	4.27½
Lead, New York.....	4.20	4.20	4.20	4.42½
Tin, New York.....	**44.75**	43.40	43.37½	42.50
Antimony, Hallett, New York..	7.75	7.75	7.75	9.00
Tin plate, 100-lb. box, New York	$3.54	$3.54	$3.54	$3.94

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb., New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.25c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per square foot, take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in. on thinnest edge	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates) 3 ft. and over in length	.10
Complete circles, 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Wire Rods and Wire.—Bessemer, open hearth and chain rods, $25. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days, or 2 per cent. discount in 10 days, carload lots, to jobbers, annealed, $1.40; galvanized, $1.70. Carload lots to retailers, annealed, $1.50; galvanized, $1.80. Galvanized barb wire, to jobbers, $1.90; painted, $1.60. Wire nails, to jobbers, $1.60.

The following table gives the prices to retail merchants on wire in less than carloads, including the extras on Nos. 10 to 16, which are added to the base price:

Fence Wire, per 100 Lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed	$1.55	$1.60	$1.65	$1.70	$1.80	$1.90	$2.00	$2.10
Galvanized	1.85	1.90	1.95	2.00	2.10	2.20	2.60	2.70

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in., and angles, 3 to 6 in., on one or both legs, ¼ in. and over, 1.25c. Other shapes and sizes are quoted as follows:

	Cents per lb.
I-beams over 15 in.	1.30 to 1.35
H-beams over 18 in.	1.30 to 1.35
Angles over 6 in.	1.30 to 1.35
Angles, 3 in. on one or both legs, less than ¼ in. thick, plus full extras, as per steel bar card Sept. 1, 1909	1.30 to 1.35
Tees, 3 in. and up	1.30 to 1.35
Zees, 3 in. and up	1.25 to 1.30
Angles, channels and tees, under 3 in., plus full extras as per steel bar card Sept. 1, 1909	1.30 to 1.35
Deck beams and bulb angles	1.55 to 1.60
Hand rail tees	2.10 to 2.25
Checkered and corrugated plates	2.10 to 2.25

Sheets.—Makers' prices for mill shipments on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows:

Blue Annealed Sheets

Nos. 3 to 8	1.25 to 1.30
Nos. 9 and 10	1.35 to 1.40
Nos. 11 and 12	1.40 to 1.45
Nos. 13 and 14	1.45 to 1.50
Nos. 15 and 16	1.55 to 1.60

Box Annealed Sheets, Cold Rolled.

Nos. 10 to 12	1.55 to 1.60	.....
Nos. 13 and 14	1.60 to 1.65	.....
Nos. 15 and 16	1.65 to 1.70	1.75 to 1.80
Nos. 17 to 21	1.70 to 1.75	1.80 to 1.85
Nos. 22, 23 and 24	1.75 to 1.80	1.85 to 1.90
Nos. 25 and 26	1.80 to 1.85	1.90 to 1.95
No. 27	1.85 to 1.90	1.95 to 2.00
No. 28	1.90 to 1.95	2.00 to 2.05
No. 29	1.95 to 2.00	2.05 to 2.10
No. 30	2.05 to 2.10	2.15 to 2.20

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	1.90 to 2.00
Nos. 12, 13 and 14	2.00 to 2.10
Nos. 15 and 16	2.10 to 2.15
Nos. 17 to 21	2.30 to 2.40
Nos. 22, 23 and 24	2.40 to 2.50
Nos. 25 and 26	2.60 to 2.70
No. 27	2.75 to 2.85
No. 28	2.90 to 3.00
No. 29	3.00 to 3.10
No. 30	3.20 to 3.30

All above rates on sheets are f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on wrought pipe, in effect from December 1, 1911; galvanized iron pipe, from March 1, 1912:

Butt Weld.

	Steel		Iron	
	Black.	Galv.	Black.	Galv.
⅛ and ¼ in.	74	54	68	49
⅜ in.	75	65	69	53
½ in.	78	68	72	59
¾ to 1½ in.	81	72	75	64
2 to 3 in.	82	75	76	65

Lap Weld.

1¼ and 1½ in.	..	..	68	61
2 in.	79	72	72	63
2½ to 4 in.	81	74	74	66
4½ to 6 in.	80	72	73	65
7 to 12 in.	78	68	71	61
13 to 15 in.	55	..	47	..

Butt Weld, extra strong, plain ends, card weight.

⅛, ¼, ⅜ in.	70	60	65	55
½ in.	75	69	70	63
¾ to 1½ in.	79	73	74	65
2 to 3 in.	80	74	75	66

Lap Weld, extra strong, plain ends, card weight.

1½ in.	..	..	66	60
2 in.	76	70	71	63
2½ to 4 in.	78	72	73	66
4½ to 6 in.	77	71	72	65
7 to 8 in.	70	60	65	55
9 to 12 in.	65	55	60	50

Butt Weld, double extra strong, plain ends, card weight.

½ in.	65	59	60	52
¾ to 1½ in.	68	62	63	55
2 to 3 in.	70	64	65	57

Lap Weld, double extra strong, plain ends, card weight.

2 in.	66	60	61	52
2½ to 4 in.	68	62	63	57
4½ to 6 in.	67	61	62	56
7 to 8 in.	60	50	55	45

Plugged and Reamed.

1 to 1½, 2 to 3 in. Butt Weld 2, 2½ to 4 in. ..... Lap Weld	Will be sold at two (2) points lower basing (higher price) than merchants' or card weight pipe. Butt or lap weld as specified.

The above discounts are for "card weight," subject to the usual variation of 5 per cent. Prices for less than carloads are three (3) points lowest basing (higher price) than the above discounts.

Boiler Tubes.—Discounts on lap welded steel and standard charcoal iron boiler tubes to jobbers in carloads are as follows:

Steel.		*Standard Charcoal Iron.*	
1¾ to 2¼ in.	65	1½ in.	48
2½ in.	67½	1¾ to 2½ in.	50
2¾ to 3¼ in.	72½	2½ in.	53
3½ to 4 in.	75	2¾ to 5 in.	60
5 to 6 in.	67½	Locomotive and steamship special grades bring higher prices.	
7 to 13 in.	65		

2½ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f. o. b. mill at Pittsburgh basing discount, lowered by two points.

Pittsburgh

PITTSBURGH, PA., April 24, 1912.

The advance in prices of steel bars to 1.20c. and plates and shapes to 1.25c. by the leading steel companies, effective from Monday, April 22, and the announcement late last week by the American Sheet & Tin Plate Company that hereafter it will sell roofing material on a per lb. basis instead of by area, are the important developments of the week. Prior to the advance on steel bars, plates and shapes, consumers were given a chance to cover, of which they took advantage, and it is not likely therefore that the higher prices will be thoroughly tested for some little time. All the steel mills in this and the Youngstown district are running to practically full capacity, and have very large bookings for delivery in second and third quarters, so that the present active situation seems assured over the next three or four months. Pig iron consumption keeps up at an enormous rate and while the local inquiry is quiet, the market is strong. The Steel Corporation is expected to buy 15,000 to 20,000 tons of Bessemer pig iron in the next week or two because of a shortage of metal. The tin plate and sheet mills are particularly active, with prices on the latter ruling about $1 a ton higher. Wrought pipe is in good demand. Coke has quieted down, due to the settlement of the threatened coal strike and prices on prompt furnace coke are somewhat easier. The scrap market is strong, with a moderate amount of material being taken by consumers. Higher prices on steel making scrap are expected in the near future.

Pig Iron.—While the Carnegie Steel Company is making 22,000 tons of pig iron per day, it is somewhat short of metal and will probably in the next week or two buy 15,000 to 20,000 tons of Bessemer iron for prompt delivery. The local market is strong, but as regards sales and inquiries is quiet. While several fair-sized lots of foundry iron are under negotiation, little new business has been closed up for a week or more. Consumers are taking iron promptly. Clinton furnace in this city, which has been out for some time, will probably go in at an early date. We quote: Bessemer, $14.25; basic, $13 to $13.25; malleable Bessemer, $13 to $13.25; No. 2 foundry, $13.25, and gray forge, $12.75, all at Valley furnace, the freight rate to the Pittsburgh district being 90c. a ton.

Steel Billets and Sheet Bars.—It is reported that several Youngstown steel mills have advanced prices $1 a ton for delivery in third quarter, or to the basis of $21 minimum for sheet bars. Nearly all consumers of steel are covered by contracts, but a fair amount of new tonnage is being sold made up of odds and ends, this business being taken care of by the smaller steel plants. A sale of 2000 tons of 4 x 4-in. open-hearth billets, ordinary carbons, for delivery over the next three months, is reported on the basis of about $20, Pittsburgh. We quote f.o.b. Pittsburgh, Bessemer and open-hearth billets, $20; Bessemer and open-hearth sheet bars, $21; axle billets, $25; forging billets for general forging purposes, $28. Prices f.o.b. Youngstown are: Bessemer and open-hearth billets, $19.50 to $20; Bessemer and open-hearth sheet bars, $20.50 to $21.

Ferromanganese.—There is still a great scarcity of ferromanganese for prompt shipment, and several carload lots have sold at prices ranging from $45 to $50. Inquiries are only for carload lots for prompt shipment. We quote English 80 per cent. for forward delivery at $43.50, Baltimore, the freight rate for delivery in the Pittsburgh district being $1.95 a ton.

Ferrosilicon.—Sales of two carloads, or about 60 tons, of 50 per cent. have been made at the full price of $70, delivered. Inquiry is light. We quote 50 per cent. in lots up to 100 tons at $70; over 100 tons to 600 tons, $69, and over 600 tons, $68, Pittsburgh. The lower grades are ruling at about $20 for 10 per cent.; $21 for 11 per cent.; $22 for 12 per cent., f.o.b. cars at furnace, Ashland, Ky., or Jackson, Ohio.

Wire Rods.—The falling off in new business in wire and wire nails is reflected in rods, the demand for which is only for very small lots. Prices are not as firm as they have been and it is probable that on a good-sized lot of Bessemer or open hearth, the prevailing price would be shaded. We quote Bessemer, open hearth and chain rods at $25, Pittsburgh.

Muck Bar.—Some inquiry has come out in the past two days, one consumer being reported in the market for 1000 tons for May and June delivery. We quote best grades of muck bar, made from all pig iron, at $28.50 to $29, delivered at buyer's mill in the Pittsburgh district.

Skelp.—More inquiry is reported and the tone of the market is stronger. We quote grooved steel skelp at 1.12½c. to 1.15c.; sheared steel skelp, 1.17½c. to 1.20c.; grooved iron skelp, 1.45c. to 1.50c., and sheared iron skelp, 1.60c. to 1.65c., all for delivery at buyer's mill in the Pittsburgh district.

Steel Rails.—The Cambria Steel Company has taken 1000 tons of standard sections for the Erie Railroad. New orders for light rails have been rather quiet since the recent advance in prices, but with the settlement of the threatened coal strike there has been a little more inquiry. New orders and specifications for light rails received by the Carnegie Steel Company in the past week amounted to about 1500 tons. All three Edgar Thomson rail mills of that company are in operation to nearly full capacity, No. 1 mill being on standard sections, No. 2 on sheet bars and No. 3 on light rails. The Ohio Works of this company at Youngstown is still running on open-hearth rails. The company reports some fairly large orders for splice bars and its mill at Duquesne is running full. We quote splice bars at 1.50c. per lb. and rails as follows: Standard sections, 1.25c. per lb.; 8 and 10-lb. light rails, 1.29½c.; 12 and 14-lb., 1.20c.; 16 and 20-lb., 1.15c.; 25, 30, 35, 40 and 45-lb., 1.10c., in carload lots, f.o.b. Pittsburgh.

Structural Material.—The American Bridge Company has taken about 10,000 tons of steel for the new open-hearth buildings of the Brier Hill Steel Company, Youngstown, Ohio. Some very low bids are understood to have been received. The same company has taken 1600 tons of bridge work for a Western railroad, while the Fort Pitt Bridge Works of this city has taken 1500 to 2000 tons additional steel for the Long Island Railroad for the elimination of grade crossings. On Monday the Cambria, Carnegie and Jones & Laughlin steel companies advanced prices on shapes to the basis of 1.25c., f.o.b. Pittsburgh. As consumers were given a chance to cover for some time ahead at the old price it is not likely that much new business will be placed on the new basis for a little while. We quote beams and channels up to 15 in. at 1.25c., Pittsburgh.

Plates.—On Monday the Carnegie, Jones & Laughlin, Cambria and Republic companies advanced prices on plates ¼ in. and heavier to the basis of 1.25c., Pittsburgh. The Carnegie Company is reported as filled up on plates to June 15 or beyond, Cambria is not promising deliveries inside of six weeks and Republic is also well filled, so that the present situation seems assured to midsummer. Reports are current that a very large inquiry for steel cars is in the market, but the name of the railroad has not been disclosed. The Proctor-Gamble Company, Cincinnati, has placed 100 steel underframes with the Pressed Steel Car Company. The Jones & Laughlin Steel Company is in the market for 60 100-ton steel gondola cars for its Aliquippa & Southern Railroad, which is its works railroad for the Aliquippa plant. These gondola cars are of specially heavy design and are of 30 tons greater carrying capacity than the special gondola cars recently ordered by a Southern road. The Buffalo, Rochester & Pittsburgh Railroad is reported in the market for 1000 steel underframes. We quote ¼-in. and heavier plates at 1.25c., Pittsburgh.

Sheets.—Of special interest in the sheet trade is the announcement made late last week by the American Sheet & Tin Plate Company that hereafter it will sell various forms of sheet roofing on a per pound instead of an area basis, in the hope of correcting some of the evils that have crept into the roofing business. This matter has been under consideration for some time. This action will no doubt be followed by other makers of sheets, and while at first there may be some confusion over the new method in the end it will work out satisfactorily. The prices as sent out by the American Sheet & Tin Plate Company, effective from Thursday, April 18, being extras above prices of flat black sheets, are as follows: 2½ and 3-in. corrugations, 5c. per 100 lb. for all gauges running No. 12 and lighter; 1¼ and ⅝-in. corrugations, 10c. per 100 lb. for all gauges running No. 20 and lighter. Charges for painting are on gauges Nos. 25 to 28, 15c. per 100 lb.; Nos. 19 to 24, 10c. per 100 lb.; Nos. 12 to 18, 5c. per 100 lb. These are separate charges. For instance, No. 28 gauge 2½-in. painted corrugated would be 20c. per 100 lb. over the price of flat black sheet. General conditions in the sheet trade are fine, specifications being enormously heavy, while the new demand is also quite active. The tone of the market is decidedly firmer, and while all the mills have not advanced their prices to those announced by the American Sheet & Tin Plate Company under date of April 11, which are based on 1.95c. on No. 28 black and 3c. for No. 28 galvanized, nearly all the mills are asking higher prices and we therefore advance our quotations on sheets $1 per ton. The American Sheet & Tin Plate Company is operating to about 85 per cent. of its hot sheet mill capacity and the independent mills are running from 90 to 95 per cent. There is still a scarcity of sheet bars, which is likely to grow worse. Mills are finding it difficult to get bars as fast as needed. We quote 1.90c. for No. 28 black and 2.95c. for No. 28 galvanized in carload and larger lots.

Tin Plate.—There is not much new demand, as nearly all consumers are well covered, but specifications continue heavy. The American Sheet & Tin Plate Company is operating to about 95 per cent. of capacity and would be running at a higher rate but for its inability to get tin bars as fast as needed. It is probable that its Humbert works at South Connellsville, Pa., which is a black plate proposition, will be started up in the near future if a supply of steel can be assured. The indications point to the consumption of tin plate this year as the heaviest ever known in the history of the trade. Some of the can makers who contracted for their supplies have specified for the entire tonnage and have since sent in additional orders. On the small new inquiry that is coming out, makers are quoting from $3.30 to $3.40 per base box for 14 x 20 coke plates, and we are advised that the lower price is absolute minimum of the market.

Iron and Steel Bars.—A heavy buying movement has taken place in steel bars, and it is estimated that fully 300,000 tons have been contracted for by implement makers and other consumers for delivery over all of this year, while in the case of the implement makers their contracts run to July 1 next year. This class of buying has been done earlier than usual. In view of the fact that the implement makers have been allowed to contract for delivery up to July 1 next year, it is positively stated they did not receive any advantage in price but are to pay on the basis of 1.15c., f.o.b. Pittsburgh. The Carnegie, Jones & Laughlin and Cambria companies have all sent notices to their selling agents naming 1.20c. as the minimum price on steel bars, effective from Monday, April 22, while the Republic took similar action last week. The new demand for iron bars is fairly active and some makers are asking an advance of $1 a ton on account of the higher prices being quoted on steel bars. We quote steel bars on new orders at 1.20c. and common iron bars at 1.25c. to 1.30c., f.o.b. maker's mill.

Hoops and Bands.—A very heavy tonnage in hoops and bands has recently been placed, prices on hoops now ruling at 1.25c. to 1.30c. and on bands at 1.15c. The makers of steel bands are now quoting 1.20c. in sympathy with the new price on steel bars, and hoops are generally quoted at 1.30c., but in very special cases 1.25c. is still being done.

Rivets.—Makers report quite an active demand and state that specifications against contracts are coming in more freely. The tone of the market is stronger and slightly higher prices in the near future seem probable. We continue to quote structural rivets at 1.45c. to 1.50c. and boiler rivets at 1.55c. to 1.60c. in large lots.

Shafting.—Makers report the demand considerably heavier, with better specifications against contracts. The tone of prices is stronger, and cold-rolled steel shafting is now being very generally held on the basis of 67 per cent. off in carload and larger lots and 62 per cent. off in small lots delivered in base territory.

Railroad Spikes.—New demand is reported slightly better, and specifications are coming in more freely. Prices are firmer. We quote railroad spikes in base sizes at $1.40 per 100 lb., f.o.b. Pittsburgh.

Spelter.—The market has been much more active and prices have shown a sharp advance. We quote prime grades of Western at 6.70c., East St. Louis, equal to 6.82½c., Pittsburgh.

Merchant Steel.—Some heavy contracts for spring and machinery steel have been placed in the past week or two for shipment over the remainder of this year. One leading maker states that it has more orders on its books for rolling at the present time than in any period for the past two years. Still further improvement in demand is expected. Shipments this month promise to be heavier than in March. Prices are strong, but not any higher. We quote: Iron finished tire, 1½ x ⅜-in. and larger, 1.15c., base; planished tire, ⅛-in. and larger, 1.35c.; channel tire, ¾, ⅞ and 1-in., 1.65c.; toe calk, 1.70c., base; flat sleigh shoe, 1.25c.; concave or convex, 1.55c.; cutter shoe tapered or bent, 2.15c.; spring steel, 1.75c.; machinery steel, smooth finish, 1.50c., all f.o.b. at mill.

Wire Products.—A falling off in the demand for wire and wire nails has been experienced this month as compared with March. Farmers went from winter weather directly into farm work and did not have time to devote to build new fences and repair old ones, so that much of the spring trade was thereby lost. The weather has also been much against building operations and this has restricted the consumption of wire nails. Regular prices are fairly well maintained by manufacturers but in some cases jobbers are slightly shading them: We quote wire nails at $1.60; cut nails, $1.50; galvanized barb wire, $1.90; painted, $1.60; annealed fence wire, $1.40, and galvanized fence wire, $1.70, f.o.b. Pittsburgh, usual terms, freight added to point of delivery.

Iron and Steel Scrap.—The local market is very strong and a good deal of material is changing hands from dealers to consumers. Dealers claim there is no trouble in selling scrap at to-day's prices but are still of the opinion that on account of the heavy consumption slightly higher prices in the near future are not unlikely and for this reason are not inclined to go short. There is a scarcity of cast-iron borings and prices are higher. It is claimed that heavy steel scrap has sold in several cases at $13.25, and some dealers are refusing to sell below that figure. We note sales of 500 tons of low phosphorus melting stock at $15; 700 tons of borings at $9.75 to $10; 500 tons of heavy steel scrap at $13; 500 tons at $13.25, and 100 tons of steel axles at $16, all for delivery in the Pittsburgh and adjacent districts. Dealers are quoting as follows, per gross ton, f.o.b. Pittsburgh, unless otherwise noted:

Heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen and Pittsburgh delivery	$13.25
No. 1 foundry cast	$12.75 to 13.00
No. 2 foundry cast	10.75 to 11.00
Bundled sheet scrap f.o.b. consumers' mill, Pittsburgh district	11.25 to 11.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	13.25 to 13.50
No. 1 railroad malleable stock	11.75 to 12.00
Grate bars	9.50 to 9.75
Low phosphorus melting stock	15.00
Iron car axles	21.00 to 21.50
Steel car axles	15.75 to 16.00
Locomotive axle	22.00 to 22.50
No. 1 busheling scrap	11.50 to 11.75
No. 2 busheling scrap	8.00 to 8.25
Old car wheels	13.00 to 13.25
*Cast iron borings	9.75 to 10.00
*Machine shop turnings	10.00 to 10.25
†Sheet bar crop ends	14.00 to 14.25
Old iron rails	14.50 to 14.75
No. 1 wrought scrap	13.00 to 13.25
Heavy steel axle turnings	10.25 to 10.50
Stove plate	9.50 to 9.75

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

Merchant Pipe.—An active inquiry is in the market for a gas line which will require upward of 40,000 tons of pipe, comparing well with the Calgary order of 50,000 tons taken by the National Tube Company some months ago. Several fairly large contracts for large pipe for gas and oil lines have been placed in the past week or two, but some of these are not ready for announcement, as rights of way have not been secured. The National Tube Company has taken a contract for 21 miles of 16-in. pipe. The actual orders booked by the pipe mills on merchant pipe so far this year show a heavy increase over the same period last year. As

a rule the pipe mills are operating from 85 to 90 per cent. of capacity. It is stated that regular discounts in iron and steel pipe are being fairly well maintained.

Boiler Tubes.—The market is more active than for some time, and liberal specifications are being received from the railroads on contracts. Several makers report that the new demand for merchant tubes is showing some betterment, but prices are still unsatisfactory.

Coke.—The new demand for spot furnace and foundry coke has quieted down to some extent, several local and Eastern consumers that have been rather free buyers now having their own supply and being out of the market. Several inquiries for furnace coke over second half of the year are in the market, but have not been closed, the ideas of furnacemen and coke makers as to prices being rather far apart. We note sales of 10,000 to 12,000 tons of prompt furnace coke at prices ranging from $2.50 to $2.65 per net ton at oven. The output in the upper and lower Connellsville regions last week showed a falling off as compared with the previous week of about 60,000 tons, this being due to the fact that the men did not work full time. We quote standard grades of furnace coke for prompt shipment at $2.50 to $2.55 and standard makes of 72-hour foundry coke at $2.85 up to $3 per net ton at oven.

The offices of Walter-Wallingford & Co., dealers in pig iron and coke, have been removed from room 2216 Farmers' Bank Building, Pittsburgh, to room 2126 in the same building.

Boston

BOSTON, MASS., April 23, 1912.

Old Material.—Dealers here believe that prices have reached the high point for the present; that actual business does not warrant further advances over last week's quotations. Speculation is in evidence and until the volume of transactions in the way of orders has increased to a considerable degree no sound reason can exist for the payment of more money for scrap. The prices quoted below are those offered by the large dealers to the producers and to the smaller dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points, taking Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices.

Heavy melting steel	$9.75 to $10.25
Low phosphorus steel	11.45 to 11.95
Old steel axles	14.00 to 14.50
Old iron axles	17.00 to 18.00
Mixed shafting	13.00 to 13.50
No. 1 wrought and soft steel	10.00 to 10.50
Skeleton (bundled)	8.00 to 8.50
Wrought iron pipe	8.75 to 9.25
Cotton ties	7.75 to 8.25
No. 2 light	4.50 to 5.00
Wrought turnings	6.50 to 7.00
Cast borings	6.25 to 6.75
Machinery, cast	12.50 to 13.00
Malleable	8.75 to 9.25
Grate bars	6.00 to 6.50
Stove plate	8.00 to 8.50
Cast iron car wheels	11.75 to 12.00

Chicago

CHICAGO, ILL., April 24, 1912. (*By Telegraph.*)

Contracting for iron and steel the past week has had all the appearance of old time activity. From the standpoint of tonnage, it was doubtless the heaviest week this year if not in the 12 months past. Conspicuous in the movement were the implement interests who, besides contracting for their season's requirements in rolled shapes, also purchased heavily of pig iron. Malleable founders also have been heavy buyers for last half deliveries. Bars, plates and shapes were advanced $1 a ton on Saturday. Local mills also advanced track bolts and black and galvanized sheets $1 a ton the same day. There is a good inquiry for cast iron pipe, and several large municipal contracts are pending. Scrap shows no abatement in strength, prices continuing to rise. In nonferrous metals there is a brisk inquiry for tin but orders are light, owing to the high prices asked. Copper is sluggish and lead is lower.

Pig Iron.—Lake furnaces have monopolized the pig iron movement this week as they did the week previous. The buying has been extraordinarily brisk, and the week's sales will loom large in the year's figures. One estimate puts the total contracts for the two weeks past at over 150,000 tons. Agricultural and malleable interests were the principal buyers. Most of them covered their requirements through the last half but toward the end of the movement furnaces showed a disinclination to sell at present prices for the last quarter. The market is undeniably stronger and an early advance is predicted in Northern irons. Some local furnaces are even now declining to quote the minimum price on less than 500-ton lots. For such requirements $14.50 is asked. Only on large tonnages and for deliveries running through to the end of the year has the $14 schedule been obtainable by buyers. Jackson County silveries have been advanced 50c. per ton. Lake Superior charcoal and Southern irons, while not higher, are considerably stiffer and $11, Birmingham, for No. 2 seems the best that can be done for the last half and for fourth quarter, with some furnaces asking $11.50. An Indiana plow company and a Milwaukee machinery builder contracted this week for an aggregate of 5000 tons of charcoal pig. The inquiry from La Porte for 3000 to 5000 tons is reported to have been placed with furnaces in the Detroit district. The local stoker company which has been figuring on its last half requirements has contracted for 5000 tons, two-thirds being Northern iron. Considerable of the malleable iron buying this week is destined for car work. One of the new Iroquois stacks is expected to blow out for six weeks for repairs. We quote for Chicago delivery, except for local irons, which are f.o.b. furnace, the following prices on prompt shipments:

Lake Superior charcoal	$15.75 to $16.50
Northern coke foundry No. 1	14.50 to 15.00
Northern coke foundry, No. 2	14.00 to 14.50
Northern coke foundry, No. 3	14.00 to 14.25
Northern Scotch, No. 1	16.00
Southern coke, No. 1 foundry and No. 1 soft	15.35 to 15.85
Southern coke, No. 2 foundry and No. 2 soft	15.10 to 15.35
Southern coke, No. 3	14.85 to 15.10
Southern coke, No. 4	14.35
Southern gray forge	13.85
Southern mottled	13.85
Malleable Bessemer	14.00
Standard Bessemer	16.75
Basic	14.75
Jackson County and Kentucky silvery, 6 per cent.	16.90
Jackson County and Kentucky silvery, 8 per cent.	17.90
Jackson County and Kentucky silvery, 10 per cent.	18.90

(*By Mail*)

Rails and Track Supplies.—An advance of $1 a ton in track bolts is the only noteworthy change. From a tonnage standpoint, the local situation is all that mills can desire. New business is brisk and specifications are abundant. Most of the incoming tonnage is for standard sections but light rails also show a good improvement. The demand for track supplies is very heavy, as is expected at this season. We quote standard railroad spikes at 1.50c. to 1.60c., base; track bolts with square nuts, 1.95c., base, all in carload lots, Chicago; standard section Pessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.20c. to 1.25c.; 16 to 20 lb., 1.25c. to 1.30c.; 12 lb., 1.30c. to 1.35c.; 8 lb., 1.35c. to 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—The anticipated advance of $1 a ton went into effect April 20. It does not appear to have lessened the demand. One large interest reports that its total new tonnage for all rolled products last week ran into five figures, while its specifications were in six figures. This is considerably beyond its capacity. Six weeks to two months is about the best mill delivery now obtainable in this market. Considerable new work is being figured on by local fabricators and their prices are strengthening. Contracts closed last week include the following: Supreme Court building, Salem, Ore., 340 tons, to the American Bridge Company; Chicago, Burlington & Quincy Railroad station and office building, Galesburg, Ill., 266 tons, to the Morava Construction Company, Chicago; Equitable Building, Chicago, 184 tons, to the Noelke-Richards Iron Works, Indianapolis, Ind.; Chicago, Milwaukee & St. Paul Railroad, six turntables, 392 tons, to the American Bridge Company; Chicago & Northwestern, 1600 tons of girders, to the American Bridge Company. The Northern Pacific also has awarded its contract for rebuilding its shops and roundhouses at Yardley, Wash., 208 tons. We quote Chicago delivery, plain material, mill shipment, 1.43c. and from store 1.65c.

Plates.—Other than that prices have advanced $1 a ton, there is nothing of particular interest to report. New business is of satisfactory proportions, while specifications continue excellent. All the mills report comfortably filled order books, the best deliveries now obtainable being four to six weeks. We quote for Chicago delivery, mill shipment, 1.43c., and from store 1.65c.

Sheets.—An advance of $1 a ton on black and galvanized sheets is announced by the leading local interest, effective since April 18. Investigation does not confirm that these higher levels are being adhered to strictly by the smaller interests and a slightly irregular market is anticipated until the consumption of sheet bars purchased at the lower prices that have been pre-

vailing is completed. There is an excellent demand, and those mills with a well-established reputation for their product are experiencing no difficulty in keeping their order books amply filled at the higher prices. The decision announced by the Inland Steel Company and the American Sheet & Tin Plate Company to sell corrugated and other roofing and siding sheets by weight instead of by square, as heretofore, seems to have received the thorough approval of all branches of the consuming and distributing trades. We have revised our prices and quote Chicago delivery as follows: Carload lots, from mill, No. 28 black sheets, 2.08c. to 2.13c.; No. 28 galvanized, 3.13c. to 3.18c.; No. 10 blue annealed, 1.58c. to 1.63c. Prices from store are No. 10, 1.90c.; No. 12, 1.95c.; No. 28 black, 2.30c., and No. 28 galvanized, 3.45c.

Bars.—All reports indicate that implement and other agricultural interests have contracted heavily this month for their season's requirements of steel bars. April is considered unusually early for this class of buying, but undoubtedly the movement was accentuated by the announced advance of $1 a ton effective April 20. Seventy-five per cent. of the trade is believed to have covered its full requirements for periods varying from December 31, 1912, to June, 1913, the total purchases being approximated at 250,000 tons. It is too early to report on the strength of the new schedule but previous practice has been to take care of the laggards, providing their tonnage and specifications were of satisfactory volume and nature. The demand for bar iron is good but prices continue irregular. This is not unexpected in a product which feels so quickly the frequent fluctuations in the cost of its raw material. Local prices have a range of $2 a ton, the maximum price of 1.25c. being asked by the Interstate Iron & Steel Company. We quote as follows: Bar iron, 1.15c. to 1.25c.; hard steel bars, 1.20c. to 1.25c.; soft steel bars 1.38c., and from store, soft steel bars 1.50c. to 1.55c., Chicago.

Old Material.—The upward movement in values continues almost unabated. Six new railroad lists are out this week with an aggregate of about 20,000 tons. That the maximum values have not been reached is evidenced both by the ease with which heavy offerings are absorbed and by the withdrawal two weeks ago of the Santa Fé list. This railroad is reported to have 100,000 tons of scrap in stock. Country dealers hold the key to the situation. Few have disposed of their winter accumulations and until they commence to unload dealers anticipate no trouble in holding the market at its present level. Most of the scrap coming out is either rerolling or heavy melting steel. Puddling scrap appears scarce, as also is foundry scrap. New offerings include 9000 tons by the Northern Pacific to be closed April 29, of which 4500 tons are steel rerollers, 1425 tons iron rails and 540 tons steel rails less than 5 ft. The Chicago Junction Railway has a list of 3500 tons, of which 2700 tons are steel rerollers. The Chicago & Alton list of 300 tons is all rerolling rails and melting steel. In addition there are the Burlington list for 2200 tons; Chicago & Eastern Illinois, 1000 tons, and the Queen & Crescent, 350 tons. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.	
Old iron rails	$16.00 to $16.50
Old steel rails, rerolling	13.00 to 13.25
Old steel rails, less than 3 ft.	12.00 to 12.25
Relaying rails, standard section, subject to inspection	24.00
Old car wheels	13.50 to 14.00
Heavy melting steel scrap	11.75 to 12.25
Frogs, switches and guards, cut apart	11.50 to 12.00
Shoveling steel	11.25 to 11.75
Steel axle turnings	9.50 to 10.00
Per Net Ton.	
Iron angles and splice bars	$13.75 to $14.25
Iron arch bars and transoms	15.00 to 15.50
Steel angle bars	11.00 to 11.50
Iron car axles	19.25 to 19.75
Steel car axles	16.00 to 16.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.50 to 12.00
Steel knuckles and couplers	11.00 to 11.50
Steel springs	11.00 to 11.50
Locomotive tires, smooth	13.00 to 13.50
Machine shop turnings	7.25 to 7.75
Cast and mixed borings	6.75 to 7.00
No. 1 busheling	10.25 to 10.75
No. 2 busheling	7.50 to 7.75
No. 1 boilers, cut to sheets and rings	8.00 to 8.25
Boiler punchings	13.00 to 13.50
No. 1 cast scrap	12.00 to 12.50
Stove plate and light cast scrap	10.25 to 10.75
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.25 to 10.75
Pipes and flues	9.25 to 9.50

Cast Iron Pipe.—Columbus, Ohio, is taking prices on 1500 tons; Cincinnati, 750 tons, and St. Louis, 7800 tons. The last named inquiry is expected to be closed May 3. The Cincinnati requirements are largely confined to 16-in. The general trade is quiet and railroad business noticeably so. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $27; 6 to 12 in., $25; 16 in. and up, $24.50, with $1 extra for gas pipe.

Wire Products.—The general backwardness of spring has retarded the demand for nails, fencing and barb wire. In some departments, especially woven wire, the business will be lost until after harvest, when the farmer will again have time for fence repairs. All prices are stronger in sympathy with the advances in other products. We continue to quote as follows: Plain wire, No. 9 and coarser, base, $1.58; wire nails, $1.78; painted barb wire, $1.78 to $1.83; galvanized, $2.08; polished staples, $1.83; galvanized, $2.13, all Chicago.

Philadelphia

PHILADELPHIA, PA., April 23, 1912.

Makers of heavy steel plates and steel bars are practically all quoting the new price basis and have been booking miscellaneous orders at the present minimum, 1.40c., delivered here, for plates, and in some instances also for shapes, and 1.35c. for bars. There seems to be a strong determination to maintain the higher basis for all classes of business. Large buyers are, however, pretty fully covered at the recent lower range of prices. Eastern mills have continued to receive orders and specifications on a very satisfactory basis, and mill production is being maintained in instances at full capacity. The Sun Oil Company is reported as receiving bids on a large oil carrying vessel, whch will requre about 4000 tons of plates and shapes. The movement in the higher grades of foundry pig iron has not been active, although some few sales have been made at slightly higher prices. Cast iron pipe makers continue free buyers. Some business in basic pig iron has also been quietly put through. Billets continue moderately active. Sheets and iron bars are rather quiet. High prices for coke still prevail. The old material market continues strong, with heavy sales of No. 1 steel melting scrap at $13.25, delivered.

Iron Ore.—The market is quiet. Negotiations for a block of Lake ore are still pending. Nothing new has developed in foreign ore. Importations in the week included 750 tons of Venezuelan, 19,548 tons of Swedish and 4900 tons of Cuban ore.

Pig Iron.—The general market is strong, although the movement in some grades has been a trifle lighter. Most producers are well sold up for the second quarter, and with the supply of coke still of a somewhat uncertain nature are disinclined to force business or to quote for extended delivery. Stocks are gradually diminishing deliveries in nearly all grades being freely taken by consumers. While there has been some fair inquiry for the higher grades of foundry iron sales have been usually of small lots for early delivery. Standard brands of eastern Pennsylvania No. 2 X foundry are still available at $15, delivered, for second quarter, although sales are made at $15.25, delivered, and in scattered cases $15.50 has been obtained for moderate lots. There is still an active movement in low grade foundry iron. Delaware River pipe foundries are still in the market, but find Northern low grade iron scarce, with $14.50, delivered, the usual minimum quotation. One melter has purchased upward of 4500 tons of Virginia No. 2 plain foundry at about $12.50, at furnace, and is also reported to have purchased a round lot of Southern low grade, although the latter transaction is unconfirmed. Sales of small quantities of Virginia No. 2 X are reported at $13, at furnace, while at least one 1000-ton lot of No. 2 plain was closed at $12.75. The leading Virginia maker now announces its prices for third quarter delivery, as $13, at furnace, for No. 2 X; $12.75 for No. 2 plain and $12.50, for No. 3 foundry. Very little movement in the higher grades of Southern foundry iron is reported in this district. Rolling mill forge iron appears on a flat basis of $14.50, delivered here, at which figure some small transactions are reported. There has been some quiet selling of basic iron, details of which are lacking, except that it was for early shipment, and the prices was $15, delivered. Several inquiries for this grade are still before the trade, but developments move slowly, particularly in connection with forward shipment, $15.50 delivered being usually named for third quarter delivery. The demand for standard low phosphorus iron is quieter, following recent heavy sales; makers are pretty well sold up for near future shipment and maintain quotations very firmly. The following range of prices is

named for standard brands, delivered in buyers' yards in this vicinity:

Eastern Pennsylvania No. 2 X foundry	$15.00 to $15.25
Eastern Pennsylvania No. 2 plain	14.75 to 15.00
Virginia No. 2 X foundry	15.75 to 16.00
Virginia No. 2 plain	15.25 to 15.50
Gray forge	14.50
Basic	15.00 to 15.50
Standard low phosphorus	19.50 to 19.75

Ferroalloys.—There is still considerable inquiry for prompt ferromanganese, which is extremely scarce. As reported last week, $50, Philadelphia, was readily paid for a spot lot of 100 tons. For last half shipment $43.50, Baltimore, is the general quotation, with little business being placed in this district, although sales in the West are reported. Little ferromanganese, except shipments applying on contracts, is afloat. Fifty per cent. ferrosilicon is quiet, although some inquiry is noted for the 11 per cent. grade, the price of which is unchanged at $24.80, delivered.

Billets.—A good demand for moderate lots of both rolling and forging billets is noted, aggregating sufficient volume to keep mills well engaged at close to capacity. Mills are not in as urgent need of business as they were a few weeks ago, and slight premiums are asked for small lots of forging billets. Quotations for basic open-hearth rolling billets range from $22.40 to $23.40, and forging billets, $26.40 to $28.40, delivered in this district.

Plates.—Considerable business was placed before the new price basis of 1.40c. minimum, delivered here, became effective, so that a slight lull might be expected. All previous quotations are reported to have been withdrawn by sellers in this district, and a fair volume of moderate lots has been placed at 1.40c. in carload lots, and 1.45c. in less than carloads. Eastern mills continue to operate at a high rate. Considerable new business is in sight, particularly in bridge and boat plates. Large inquiries, such as would test the strength of the new price basis, are lacking.

Structural Material.—Makers do not all appear to be a unit in asking the higher basis, 1.40c., delivered here, for plain shapes, the old quotations of 1.35c. for carloads and 1.38c. for less than carloads being still available. The demand for structural material still drags. Fabricators report little new business in this district, the only important project being the new Ritz Carlton Hotel in Atlantic City, which will require about 4000 tons. The demand for bridge material is quiet. Fabricating prices do not strengthen very materially, as most of the fabricators are protected against the advance in plain shapes by having contracts entered at old quotations.

Sheets.—The demand shows a tendency to drag, although Eastern mills are receiving a fair run of daily business and have sufficient orders on hand to enable them to operate at full capacity. Prices are strong, with an upward tendency. Ordinary Western sheets are quoted at 2c. to 2.10c., delivered here, for No. 28 gauge, although Eastern mills making smooth, loose-rolled sheets easily obtain from ¼c. to ½c. per lb. advance.

Bars.—Makers of steel bars have advanced their price to 1.35c. minimum, delivered here. Heavy orders were entered prior to the advance, and while some little business has been placed at the new basis, quieter conditions will, no doubt, be noticeable for a time at least. The demand for iron bars still drags; orders are usually small, but with prices firm at 1.27½c. to 1.32½c., delivered in this district, for the ordinary grades.

Coke.—Consumers who have not already contracted for supplies are buying sparingly, awaiting a price readjustment, expected to follow the settlement of labor disputes. Deliveries in some cases are still interrupted, even on contracts. Prompt coke continues scarce and quotations show a somewhat wider range, with $2.20 to $2.50 at oven named for prompt furnace and $2.50 to $2.80 for prompt foundry coke. Stock coke is quoted at $1.65 to $1.75 at oven. The following range of prices, per net ton, delivered in this district, about represents the market:

Connellsville furnace coke	$4.50 to $5.00
Connellsville foundry coke	4.75 to 5.25
Mountain furnace coke	4.10 to 4.60
Mountain foundry coke	4.35 to 4.85

Old Material.—While price changes are few, the market is strong with an increased movement in some grades of material. Quite large sales of No. 1 heavy melting steel scrap have been made, in instances covering canceled contracts held by E. Dreifus & Co. In one case orders for upward of 10,000 tons, and in another a slightly less quantity were taken, largely at $13.25, delivered. It is rumored that upward of 30,000 tons of heavy melting scrap was involved in the Dreifus cancellations. More inquiry for old car wheels is noted, with odd lots moving at the outside quotation. Bids of $12.50 have been made for wrought pipe, without bringing out any quantity of material; both railroad grate bars and stove plate have sold at slightly higher quotations. The following range of prices about represents the market for prompt deliveries in buyers' yards, eastern Pennsylvania and nearby points, taking a freight rate varying from 35c. to $1.35 per gross ton:

No. 1 heavy melting steel scrap and crops	$13.25 to $13.75
Old steel rails, rerolling (nominal)	14.00 to 14.50
Low phosphorus heavy melting steel scrap	15.75 to 16.00
Old steel axles	17.00 to 17.50
Old iron axles (nominal)	23.00 to 23.50
Old iron rails (nominal)	16.00 to 16.50
Old car wheels	13.00 to 13.50
No. 1 railroad wrought	15.50 to 16.00
Wrought iron pipe	12.50 to 13.00
No. 1 forge fire	11.50 to 12.00
No. 2 light iron (nominal)	7.00 to 7.50
Wrought turnings	10.00 to 10.50
Cast borings	9.75 to 10.25
Machinery cast	13.75 to 14.00
Railroad malleable (nominal)	11.75 to 12.25
Grate bars, railroad	10.50 to 11.00
Stove plate	10.50 to 11.00

Cleveland

CLEVELAND, OHIO, April 23, 1912.

Iron Ore.—A moderate volume of business was done in the past week, but the heavy buying for the season is now over. Nearly all the consumers in the Central West are now covered for their year's requirements. A few small consumers have not yet bought their ore, but are expected to do so within the next week or two. Some additional sales have been made in the East. Sellers believe that with further Eastern sales that are expected to be made from time to time during the season shipments of Lake Superior ore to the East will reach 1,000,000 tons this year, as predicted at the time of the price reduction. There has been a heavy chartering of vessel tonnage during the past few days, and shippers are now well covered with vessel contracts except the Pittsburgh Steamship Company, which is in the market for contracts for large tonnage. These will probably be all closed this week. Ore carrying rate from Escanaba has finally been established at 25c. net. The net rates from other ports, as previously reported, has been fixed at 40c. from the head of the lakes and 35c. from Marquette. The season of navigation for freight boats opened April 22. Several cargoes of ore are being loaded at Escanaba and Duluth. The first cargo will be shipped from the former port within a day or two and a start will probably be made from Duluth before May 1. We quote ore prices as follows: Old Range Bessemer, $3.75; Mesaba Bessemer, $3.50; Old Range non-Bessemer, $3.05; Mesaba non-Bessemer, $2.85.

Pig Iron.—The market on foundry grades is fairly active, and considerable tonnage for delivery through the third quarter and last half has been sold during the past few days, mostly in lots of 500 tons and under. A considerable tonnage of malleable iron has also been booked. In the northern Ohio territory a large share of the consumers have not yet covered for their requirements beyond the second quarter. Many believe that they will not have to pay higher prices if they delay for some time making their purchases for the last half. The market is very firm. While sales have been made mostly at recent quotations one local selling agency has advanced its price to $13.50 Valley Furnace for No. 2 foundry for the last half delivery. We quote the following prices for prompt shipment and for the last half, delivered Cleveland:

Bessemer	$14.15
Basic	13.75
Northern No. 2 foundry	$13.25 to 13.50
Southern No. 2 foundry	15.10 to 15.35
Gray forge	12.50 to 12.75
Jackson silvery, 8 per cent. silicon	17.30 to 17.55

Coke.—There is not much demand, but prices remain firm. A local seller reports the sale of a small amount of furnace coke at $2.80 per net ton for spot shipment. Sales of foundry grades are limited to car lots. We quote standard 72-hr. foundry coke at $2.75 to $3 per net ton.

Finished Iron and Steel.—Selling agencies have advanced their prices $1 a ton on steel bars, placing them at 1.20c., Pittsburgh, and on plates and structural material to 1.25c. and announce their intention to adhere firmly to the higher prices, which in most cases went into effect this week. During the latter part of last week there was heavy buying, and consumers are well covered by contracts which, with the exception of the agricultural implement trade, extend to October 1 or January 1. Many of the implement manufacturers were able

to get steel bar contracts for a full year's requirements from July to July. Very little new business has come out since the price advance, but specifications are good. Boiler and tank shops are busier in this territory than they have been for some time and are getting somewhat better prices. The structural situation is only fairly active, most of the work that is coming out requiring only small tonnage. The Berger Mfg. Company, Canton, Ohio, received bids April 22 for a plant addition requiring 1000 tons of steel. Sheet specifications are good, but not much new business is coming out, consumers being mostly under contract. The recent advance in prices is not being maintained, shading to the amount of $1 a ton being quite general. We quote sheets at 1.90c. for No. 28 black and 2.95c. for No. 28 galvanized. There is some demand for forging billets, which are selling on the basis of $27, Youngstown, or $28, Cleveland. Makers of hard steel bars are trying to get better prices since the advance in soft steel. Some business, however, is still being done at 1.10c., Pittsburgh. Bolt and nut makers have advanced prices 2½ per cent., this being the third 2½ per cent. advance in a few weeks. Railroads are buying a little more liberally. The Erie railroad is reported to have purchased 9000 kegs of track bolts, 5000 kegs of which went to a Cleveland manufacturer. The city of Cleveland will receive bids May 6 for 3300 tons of cast iron pipe and 210 tons of special castings for its waterworks department. The demand for iron bars is only fair. Prices are unchanged at 1.20c., Cleveland mill.

Old Material.—The local market is not active. A limited tonnage of heavy steel scrap has been sold for shipment to Sharon at $13, delivered, which, with the $1 freight deducted, is a better price than local mills are willing to pay. Local mills and dealers cannot get together on prices. The latter claim that they cannot buy scrap and sell it at the price offered by consumers. Dealers are firm on prices and expect an advance. Recent railroad offerings have brought somewhat better prices. The only railroad list out this week was one from the Nickel Plate, which closed April 22. Dealers' prices, f.o.b. Cleveland, which are unchanged, are as follows:

Per Gross Ton.

Old steel rails, rerolling	$12.25 to $12.75
Old iron rails	14.00 to 14.50
Steel car axles	17.50 to 18.00
Heavy melting steel	11.50 to 12.00
Old car wheels	12.00 to 12.50
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	10.50 to 11.00
Railroad malleable	11.50 to 12.00
Light bundled sheet scrap	9.50 to 10.00

Per Net Ton.

Iron car axles	$18.50 to $19.00
Cast borings	6.75 to 7.00
Iron and steel turnings and drillings	7.25 to 7.50
Steel axle turnings	7.75 to 8.00
No. 1 busheling	9.50 to 10.00
No. 1 railroad wrought	11.00 to 11.25
No. 1 cast	11.25 to 11.75
Stove plate	9.00 to 9.25
Bundled tin scrap	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, April 24, 1912—(*By Telegraph*).

Pig Iron.—An Ohio manufacturer last week contracted for 15,000 tons of Northern basic for last half shipment. This makes a total of about 50,000 tons of basic disposed of in this territory within the past three weeks, but only about one-half of this will be shipped from the Hanging Rock district. Inquiries are scarce, but sales are being made in fair numbers. Furnace agencies report the majority of business placed as secured through the direct solicitation of their salesmen and that frequently customers place orders without doing much shopping around. The Southern price situation is unchanged. While there is yet some Southern No. 2 foundry obtainable at $10.50, Birmingham, for spot shipment, the quantity is limited. Many furnaces are asking $11, Birmingham, for any shipment this year, and quite a number of contracts have been made at this figure. However, the more general quotations are $10.75 for third quarter and $11 for fourth quarter. For May-June shipment a nearby foundry purchased 500 tons of Southern No. 2 foundry at $10.75, Birmingham, and for last half movement another melter contracted for an equal amount at $11. A central Ohio melter took 1800 tons of mixed Northern and Southern foundry grades and a Central Western manufacturer bought 1500 tons of Northern malleable. An Indiana consumer is expected to close this week for 600 tons of Southern foundry, and there are several smaller inquiries before the trade from the same territory. Both Northern No. 2 foundry and malleable are quoted at $13.50, Ironton, for any shipment this year. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows, for prompt shipment:

Southern coke, No. 1 foundry and 1 soft	$14.25 to $14.75
Southern coke, No. 2 foundry and 2 soft	13.75 to 14.25
Southern coke, No. 3 foundry	13.25 to 13.75
Southern coke, No. 4 foundry	13.00 to 13.50
Southern gray forge	13.00 to 13.50
Ohio silvery, 8 per cent. silicon	16.70 to 17.20
Lake Superior coke No. 1	14.95
Lake Superior coke No. 2	14.70
Lake Superior coke No. 3	14.45
Basic, Northern	14.70
Standard Southern car wheel	25.25 to 25.50
Lake Superior car wheel	19.00

(*By Mail*)

Coke.—Contrary to predictions made by a number of consumers coke prices have not weakened; on the other hand, present quotations are firmer, and indications now point to a maintenance of previous figures named in all three of the principal producing fields. Connellsville standard furnace grades, for either spot or deferred delivery, are quoted around $2.35 to $2.70 per net ton at oven, and 72-hr. coke is bringing from $2.75 to $3. Wise county and Pocahontas prices are about 10c. to 15c. a ton lower. Very little business is being done in either furnace or foundry coke, and no change in the situation is looked for just now.

Finished Material.—Mill agencies are not making any special efforts to take on fourth quarter business at present prices for steel bars and structural material. However, there is considerable third quarter business coming in, and the firmer attitude of the steel companies has brought on quite a buying movement to cover nearby requirements. More than one local sales office reports an advance to 1.20c., Pittsburgh, on steel bars and 1.25c. on structural material, and it is believed that the remaining makers will join in on this advance within the next few days. Warehouse prices are unchanged at 1.55c. to 1.60c. for steel bars and 1.65c. to 1.70c. for structural material.

Old Material.—Dealers are more optimistic. Prices on several grades have advanced a little, but until the quotations on finished material, such as bars, etc., and pig iron, are advanced there is hardly any likelihood that the figures following will show much of a change. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, southern Ohio and Cincinnati, and the maximum quotations the selling prices, f.o.b. at yards:

Per Gross Ton.

Bundled sheet scrap	$8.50 to $9.00
Old iron rails	12.75 to 13.25
Relaying rails, 50 lb. and up	20.00 to 21.00
Rerolling steel rails	11.00 to 11.50
Melting steel rails	10.00 to 10.50
Heavy melting steel scrap	10.00 to 10.50
Old car wheels	11.50 to 12.00

Per Net Ton.

No. 1 railroad wrought	10.90 to 11.00
Cast borings	6.00 to 6.50
Steel turnings	6.25 to 6.75
No. 1 cast scrap	10.50 to 11.00
Burnt scrap	7.50 to 8.00
Old iron axles	16.00 to 16.50
Locomotive tires (smooth inside)	11.75 to 12.25
Pipes and flues	7.00 to 7.50
Malleable scrap	8.50 to 9.00
Railroad tank and sheet scrap	6.50 to 7.00

St. Louis

ST. LOUIS, MO., April 22, 1912.

While there has been a slight cessation of new buying there has been a steady movement of orders on contracts and continued evidence of the strength of the market in general. The tone is stronger and nothing has appeared to indicate anything of weakness. The expectation is of renewed buying and of even stronger conditions.

Pig Iron.—Although the total purchases for the past week have not been up to the aggregates of preceding weeks there has been steady buying in comparatively small lots and ready movement on specifications on existing contracts. The principal sale of the week was of 2000 tons of Southern to a Waterloo, Iowa, melter, while others ran down to the 100-ton and carload lot size, with a very good total for the week. The inquiries in the market for the moment are not numerous or large, though one representative reports an inquiry for 6000 tons. No. 2 Southern commands $11, Birmingham, with $11.50 asked for last quarter and in some instances for last half delivery. In malleable there was one sale of 400 tons. Basic showed no new activity. No. 2 Northern remains at last figures.

Coke.—There is comparatively little doing in coke at the present time, and there is still some difficulty in getting quantities wanted as a result of producing and shipping conditions. Quotations here are $2.60 to $2.75, at oven, for foundry best 72-hr. selected and $5.40 for by-product, delivered.

Finished Iron and Steel.—The run of orders in all lines has brought the total up to a very satisfactory figure. The contracting season seems to be in full swing now, and fabricating shops are taking freely against their requirements. Prices for structural are firming up toward 1.25c., Pittsburgh. The same situation is true of bars, which are in good demand, with the asking price at 1.20c. In standard rails inquiries are expected as soon as conditions in the flooded area determine the repair work necessary. Track fastenings continue in great activity, with prices tending upward. Plates are stiffening and in fair demand, considering delivery possibilities from the mills, which are heavily sold up. Light rails show improvement in some degree with both the coal and the lumber roads.

Old Material.—The scrap market is at present a matter of the strength of the dealers who have loaded up at pretty good prices and are doing their best to hold the market until they can dispose of some of their purchases. No new lists appeared during the past week, and there have been but few changes in quotations. We quote old material, f.o.b. St. Louis, as follows:

Per Gross Ton.

Old iron rails	$14.00 to $14.50
Old steel rails, re-rolling	11.00 to 11.50
Old steel rails, less than 3 ft.	11.25 to 11.75
Relaying rails, standard section, subject to inspection	21.50 to 22.00
Old car wheels	12.50 to 13.00
Heavy melting steel scrap	10.50 to 11.00
Frogs, switches and guards cut apart	10.50 to 11.00

Per Net Ton.

Iron fish plates	$12.50 to $13.00
Iron car axles	17.50 to 18.00
Steel car axles	15.00 to 15.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.25 to 10.75
Railway springs	9.25 to 9.75
Locomotive tires, smooth	11.50 to 12.00
No. 1 dealers' forge	8.50 to 9.00
Mixed borings	6.25 to 6.75
No. 1 busheling	9.00 to 9.50
No. 1 boilers, cut to sheets and rings	8.00 to 8.50
No. 1 cast scrap	10.00 to 10.50
Stove plate and light cast scrap	8.00 to 8.50
Railroad malleable	9.00 to 9.50
Agricultural malleable	8.00 to 8.50
Pipes and flues	8.00 to 8.50
Railroad sheet and tank scrap	7.50 to 8.00
Railroad grate bars	8.50 to 9.00
Machine shop turnings	7.00 to 7.50

Birmingham

BIRMINGHAM, ALA., April 22, 1912.

Pig Iron.—Some interests are a little firmer. One concern reports the sale of over 1000 tons during the week just closed at $11.50, furnace, for No. 2. The same interest reports the sale of about 5000 tons on $11 basis for No. 2. The purchases by the leading pipe interest have done much to buoy up the Alabama iron market. Doubtless the rate of production of cast-iron pipe is at as high a mark as Alabama has ever experienced and this keeps the furnace yards absolutely bare of all the lower grades, No. 3 foundry and down. The market for finished products of all kinds is being watched very closely by the pig-iron producers and they apparently stand ready to mark up pig iron in sympathy with any and every advance in steel and other finished lines. The charcoal iron interest reports further sales during last week. Pig iron can certainly be quoted very firm for Southern consumers, f.o.b. cars, Birmingham, as follows:

No. 1 foundry and No. 1 soft	$11.50
No. 2 foundry and No. 2 soft	11.00
No. 3 foundry	10.50
No. 4 foundry	10.00
Gray forge	9.75
Basic	10.50
Charcoal iron	$22.00 to 22.50

Cast Iron Pipe.—A little better inquiry has appeared during the past week and manufacturers of water pipe are holding their product very firm. While no actual advance has been made, yet it is expected that an announcement of a higher price will be made very soon. There is a good inquiry pending from some of the larger municipalities. The schedule of prices is exceedingly firm per net ton, f.o.b. cars, Alabama foundries, as follows: 4 to 6 in., $23; 8 to 12 in., $22.50; over 12 in., average, $21.

Old Material.—More interest has been manifested in the scrap iron market. There has been a better movement in all grades of pig iron and some of the foundries are taking on light cast scrap, stove plate, etc. The improved feeling has intended to make dealers very much more optimistic. At the same time, prices are continued quotable, f.o.b. dealers' yards, Birmingham, as follows:

Old iron axles (light)	$12.50 to $13.00
Old steel axles (light)	11.50 to 12.00
Old iron rails	11.50 to 12.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	9.00 to 9.50
No. 1 country wrought	6.00 to 6.50
No. 2 country wrought	5.50 to 6.00
No. 1 machinery	8.50 to 9.00
No. 1 steel	8.00 to 8.50
Tram car wheels	7.50 to 8.00
Standard car wheels	9.50 to 10.00
Light cast and stove plate	6.00 to 6.50

Coal and Coke.—Virginia producers of high-grade foundry coke are again entering the Alabama fields and quotations are being sent out to the foundries on the better grades of Virginia foundry coke at prices lower than ruled a few weeks ago. It seems evident that Virginia interests intend to maintain a certain amount of trade with Alabama and the Gulf States generally. Despite this action, however, Alabama coke continues very firm at $3.25 to $3.75 at the ovens for the best grades of foundry coke. An advance of 2½c. per ton in the coal mining price on the Pratt Seam has been posted by a leading coal producer here and it is thought this action will be followed by all other Alabama coal operators. This advance in the mining price means an extra cost of about 5c. per ton in coal. This would mean an additional cost of about 12½c. per ton in coke, or nearly 20c. per ton on pig iron. There are some complaints of a scarcity of labor in the coal mines.

Buffalo

BUFFALO, N. Y., April 23, 1912.

Pig Iron.—Market conditions continue to improve. Sales for the week have been heavy, aggregating about 60,000 tons of foundry and malleable to Eastern and Canadian melters, more than keeping pace with the rate for the preceding two weeks, both of which gave large totals. There is still a large volume of unsatisfied inquiry under negotiation with consumers tributary to this producing center amounting to 35,000 to 40,000 tons additional, substantially all of it being for third quarter and last half delivery. A sale covering nearly 40,000 tons of low silicon iron has just been learned recently made from this district to Eastern consumers, but not previously reported in these columns and not included in the week's transactions summarized above; it was principally for last half delivery, but a portion of it extending into the first half of next year. Although some slight shading may have characterized sales made in the earlier part of the week, quotations have stiffened materially in the last day or two consequent upon the large bookings and increasing inquiry. One furnace interest states that $13.75 at furnace has been declined for malleable which it now holds at $14 minimum, and another furnace interest has established $14 as the minimum for all grades, the indications being that furnaces are becoming so well sold up for forward delivery that prices will soon be marked up. The Buffalo Union Furnace Company is arranging to blow in its furnace C next week. We quote as follows, f.o.b. Buffalo, for current and third quarter and last half delivery.

No. 1 X foundry	$14.00 to $14.50
No. 2 X foundry	13.75 to 14.00
No. 2 plain	13.50 to 14.00
No. 3 foundry	13.50 to 13.75
Gray forge	13.25 to 13.50
Malleable	13.75 to 14.25
Basic	14.00 to 14.50
Charcoal	15.75 to 17.00

Finished Iron and Steel.—Large orders were booked last week prior to the advance announced to take effect April 20. The outlook for future business is promising, both producers and consumers being more optimistic as to improved market conditions and buyers evidently more anxious to close for their requirements for the remainder of the year. A good volume of orders is coming in at the new prices (1.20c. Pittsburgh for bars and 1.25c. for plates and shapes) and quite a few contracts have been taken at the advanced figures. Sheets continue active and show betterment in prices. Business in spikes, bolts, track supplies, etc., is very good and prices have stiffened. Wire products are quieter, contracts placed some time ago having pretty well taken care of consumers' requirements for the present. One sales agency reports the receipt of an inquiry for 2000 tons of billets which was declined without a

quotation being made because its billet mill capacity is fully occupied in furnishing material for its own finishing mills. In fabricated structural material a good volume of placement is reported and inquiry is increasing, one important selling agency stating that it has received more inquiries in the last 10 days than for any like period in the past 10 years. Most of the orders were small, but the aggregate was large. The Buffalo Structural Steel Company was low bidder for fabrication and erection of steel for the parochial school and assembly building for All Saints' R. C. Church, 300 tons, and the same company was awarded contract for steel for addition to the Buffalo Weaving & Belting Company's factory, about 100 tons. Architects Wood & Bradney, Buffalo, will receive bids May 1 for an eight-story office building for the Buffalo Natural Gas Fuel Company, requiring about 800 tons. Contract for steel for factory addition for the Rome Wire Works, Rome, N. Y., has been let to the Archbold Brady Company, Syracuse, N. Y.

Old Material.—The demand for heavy melting steel and wrought scrap has slackened somewhat, as local mills have curtailed their receipts on account of temporary overstock, owing to the arrival of shipments delayed in recent freight congestion. Transactions in these commodities have also been light. Prices show little change. We quote as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$12.50	to	$13.00
No. 1 railroad wrought	13.50	to	13.75
No. 1 railroad and machinery cast scrap	13.50	to	14.00
Old steel axles	18.50	to	19.25
Old iron axles	22.00	to	22.50
Old car wheels	12.25	to	12.50
Railroad malleable	12.50	to	12.75
Boiler plate sheared	13.75	to	14.25
Locomotive grate bars	11.00	to	11.25
Wrought pipe	9.50	to	10.00
Tank iron	10.00	to	10.25
Wrought iron and soft steel turnings	7.50	to	7.75
Clean cast borings	6.75	to	7.25

The German Iron Market

Record Breaking Production in March

BERLIN, April 11, 1912.

The strong position of the iron trade is evidenced by additional facts this week. The price tendency continues upward. Today the Rhenish-Westphalian Bar Dealers' Association raised the price of bars and plates by 5 marks to take effect at once. A similar advance has just been made in bars and 2.50 marks on plates by South German wholesale dealers. Berlin dealers have also just marked up bars by 5 marks. Other advances are planned for the near future. A Breslau dispatch states that a further advance in the Upper Silesian district is about to be announced. The trade combination controlling bands and hoop iron in the Rhenish-Westphalian district is to meet in a few days for the purpose of raising prices. The cartel of West German iron dealers has been called to meet in about two weeks with the intention of recommending an advance of 5 marks a ton to the various branch organizations which have not yet marked up prices. The upward tendency of prices in Belgium also continues; several days ago it was reported from Brussels that an advance of 2 shillings in the export price of heavy and light plates and bars of basic steel and wrought iron had occurred. A sharp rise in ship plates and angles is also reported this week from England. The cessation of the coal miners' strike there has been greeted with much satisfaction in the German trade, which expects a brisker demand now in that market.

The March statistics of production and shipments, so far as these have been issued, show record-breaking totals. The make of pig iron rose to 1,424,076 metric tons. December, 1911, had hitherto held the banner with 1,377,637 tons. Last month's production was 102,000 tons greater than that of March, 1911. For the first quarter of the year production was 4,116,652 tons, as against 3,821,991 tons last year. The Steel Works Union shipped 667,000 tons of semi-manufactured steel material, rails and ties and structural shapes in March, as compared with 507,272 tons in February. The March figures, which are subject to slight modifications later, break all records by a considerable margin. The shipments in these products for the business year just closed amounted to 5,993,800 tons, as against 5,337,683 tons last year. The increase of 656,000 tons was divided as follows: Semi-finished steel, 258,000 tons; structural shapes, 257,900 tons, and steel rails and ties, 143,700 tons.

The March foreign trade figures in part available show in exports the following figures: Pig iron, 81,022 tons, as against 68,533 tons last year; semi-finished steel, 29,737, against 60,847 tons; beams and structural shapes, 33,455 tons, against 31,105 tons; rails, 49,000 tons, against 54,086 tons. Imports of iron ores reached 1,059,907 tons, comparing with 1,073,913 tons last year.

The Steel Works Union held a meeting at Düsseldorf today, where it was admitted that no perceptible progress has been made in the negotiations for its renewal. A further meeting is to be held next week, and in the meantime committee meetings will be held in preparation for this general meeting.

The Hoesch Works, Dortmund, is adding three open-hearth furnaces to its present plant of six furnaces. The new furnaces will have each a capacity of 80 tons and will be among the largest in Germany. The existing furnaces have a capacity of only 30 tons.

British Iron Market Strong

A Broadening Movement with an Upward Tendency

(*By Cable*)

MIDDLESBROUGH, England, April 24, 1912.

The general situation is excellent and the outlook indicates a further and progressive improvement. The buying movement seems to be breaking, but producers show reluctance to book contracts. Some blast furnaces are now getting into full action. Meantime the drain upon stocks continues and prices talked of are much higher. Makers demand fancy figures for forward deliveries.

The German Steel Works Union has sold semi-finished steel on a considerable scale, but is now out of the market until October. American steel companies are not selling billets and sheet bars at present because, though there is plenty of demand, they cannot secure vessel room at reasonable figures.

Many tin plate mills are unable to get fuel. Prices for tin plates are very irregular. An improving Japanese inquiry is noted. We quote as follows:

Cleveland pig iron warrants (closing Tuesday), 53s. 6d. against 54s. ½d one week previous.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 54s. 3d.

German basic steel bars, f.o.b. Antwerp, £5 9s. to £5 10s.

German sheet bars, f.o.b. Antwerp, £5.

German 2-in. billets, f.o.b. Antwerp, 92s.

Steel bars, export, f.o.b. Clyde, £7 5s.

Steel joists, 15-in. export, f.o.b. Hull or Grimsby, £6 15s., up 2s. 6d.

Steel ship plates, Scotch, delivered local yard, £7 12s. 6d., an advance of 2s. 6d.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 5s.

Steel rails, export, f.o.b. works port, £6 2s. 6d.

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 14s. 1½d. to 14s. 3d., October-December.

Pig Iron Shipments Almost Unprecedented

(*By Mail*)

MIDDLESBROUGH, April 12, 1912.

The stoppage of production at the blast furnaces owing to the coal strike, now happily ended, has synchronized with very heavy withdrawals from public warehouses, and the reduction last month of 52,411 tons was almost unprecedented. Indeed it has been only twice exceeded—in April, 1907, with 56,994 tons, and in May of the same year, with 78,599 tons. It was in 1907 that the extraordinary demand for Cleveland pig iron was witnessed from Germany and the United States, which led to the stock falling from 538,184 tons to 89,200 tons, an average monthly reduction over the year of about 37,000 tons. Foreign exports last month were exceedingly heavy, and while this is an encouraging feature as far as it goes, a good many people hold the opinion that exporters have been anticipating requirements for some time ahead, and that further purchases are not likely to be made on any important scale.

The strike, indeed, has had one rather curious reflex influence, for it actually stimulated the export trade in pig iron, and the paradox is to be explained in this way: No coal being raised, no coal could be exported; hence a large number of steamers normally engaged in the coal trade were thrown out of employment. Many of these had to be laid up, while the owners of others entered into active competition with each other for any freight obtainable, and this brought down chartering rates with a run. Those with iron to ship naturally

took prompt advantage of this unexpectedly favorable development and not only dispatched their March quotas, but also cleared out their April and May supplies. Thus it happened that the quantity shipped over seas from Middlesbrough last month reached the total of 108,861 tons, against 61,890 tons in February and 52,459 tons in the corresponding month of last year. Over the first quarter of 1912 the total of 326,249 tons was the largest recorded since 1908, when 353,262 tons was shipped from the Cleveland district in the same period, while in 1907 the aggregate was 404,870 tons.

Just lately a good demand seems to have sprung up for Cleveland iron for shipment to Japan, the revolutionary troubles in China having caused the closing of the Hanyang works at Hankow, which under ordinary circumstances supply large quantities of material for the Japanese market. This has given an extra filip to Cleveland prices, but generally speaking, speculative activity remains even now of a rather restrained character, though the interest may become more pronounced as the price moves up. Meanwhile it appears to be the general impression in the trade that 55s. is a certain figure for No. 3 Cleveland in the course of a few weeks. So far no blast furnaces have resumed, and the restoration of ordinary manufacturing conditions can hardly be witnessed for a week or two at the earliest.

Consolidation in Scottish Tube Trade

The position of affairs in the various sections of the finished iron and steel trades is distinctly toward increased firmness and advances in prices are being recorded in all directions with encouraging regularity, whilst makers as a rule are still unwilling to quote far ahead. The general shutting down of production during the last month or so is certain to have a material effect upon prices all round.

The amalgamation in the Scottish tube trade which was on the tapis for so long at last reached a definite issue, the title of the fusion being the Scottish Tube, Ltd., of 5 Wellington street, Glasgow. The capital is £750,000 in £1 shares, of which 300,000 are 5 per cent. cumulative preference. The businesses acquired are the following: Caledonian Tube Company, Coats Tube Company, James Eadie & Sons, Hendry Brothers, John Marshall & Sons, David Richmond & Co., Tradeston Tube Company and Wilsons & Union Tube Company, while Stewarts & Lloyds, Ltd., have the right to nominate directors.

New York

NEW YORK, April 24, 1912.

Pig Iron.—The rate at which pig iron was being contracted for 10 days ago has scarcely been maintained in the past few days, but there is still considerable iron under inquiry, and the prospects are for a fair amount of business in the immediate future. Producers of basic iron in Pennsylvania have not done a large business in the past week, but are taking a firm stand and expect to realize $15.50 as the delivered price for iron for the third quarter. Some sales of foundry iron have been made in the New York district for the most part at the better prices furnaces have been naming recently. In tonnage malleable iron has greatly exceeded all other descriptions. Sales to malleable foundries in the Naugatuck Valley, practically all made by furnaces at Buffalo and in the Genesee Valley, amount to about 30,000 tons and the total of malleable sales by the furnaces mentioned was probably 40,000 to 50,000 tons. The prices on most of this business were from $13.40 to $13.50, Buffalo, or $15.85 to $15.95 delivered in New England. A rather unusual development is the effort of some coke manufacturers to get a slight advance from companies having contracts with them, on the ground of the recent advances in wages in the coke region. Some of these contracts were on a sliding scale basis, but the variable was the price of pig iron, with no stipulation for any advance due to increased cost of coke manufacture. We quote as follows for Northern iron at tidewater: No. 1 foundry, $15.25 to $15.50; No. 2 X, $15 to $15.25; No. 2 plain, $14.75 to $15. Southern iron is quoted at $15.50 to $15.75 for No. 1 foundry and $15 to $15.25 for No. 2 foundry.

Finished Iron and Steel.—The strength of the local situation is indicated by a general acknowledgment of a new basis of prices for steel bars, plates and structural shapes—a condition which is contrasted with that of a few months ago when the talk had reference to low rather than high price levels. Plates are strongest largely because of the full capacity at which Eastern plate mills are running, though it is admitted that unusually attractive business would shade the present announced minimum of 1.25c., Pittsburgh. Shapes are also 1.25c., Pittsburgh, though it is felt that in independent cases lower prices will obtain. The same condition applies to steel bars, which are pegged at 1.20c., Pittsburgh, and one fact which goes to point that the new basis will not generally be met for a few weeks is that some consumers are canceling unused lots on specifications. This is taken to mean that they prefer to risk an advance in the market above the carrying charge of material not needed at the moment. An interesting inquiry is one of 2000 tons reinforcing bars from the Long Island Railroad for delivery over two years. Bar iron orders are reported coming in at an encouraging rate, but the peculiar state of the bar iron market is indicated in the fact that at different Pennsylvania mills the prices range from about 1.15c. to over 1.25c. for similar refined material. Among structural contracts referred to as substantially closed last week are the following: 5200 tons for the Stern store, New York, carrying Bethlehem shapes, 2000 tons for a 12-story building at 111 East Twenty-third street and 1400 tons for the East Thirty-third Street Building Company, all for the Alfred E. Norton Company; 2900 tons for a building at Broadway and Twenty-sixth street and 800 tons for the Levi P. Morton Building, Fifth avenue, both to Milliken Bros.; 10,000 tons for the open-hearth buildings, Brier Hill Steel Company, Youngstown, Ohio, and 1500 tons for the new works of the H. W. Johns-Manville Company in New Jersey, both to the American Bridge Company, which is also understood to have arranged about a year ago for the 4000 to 5000 tons of steel which will be required for the Widener Hotel building at Atlantic City. The Berlin Construction Company is to erect a 200-ton shot tower for the Winchester Repeating Arms Company, New Haven; Lewis F. Shoemaker & Co. will supply 100 tons for two bridges for the Boston & Maine at Wachusett and Ashburton, Mass., and Post & McCord are understood to have the contract for the 1700-ton structure for the Brooklyn Baseball Club. The Chesapeake Iron Works is to build a 500-ton terminal warehouse in Baltimore. The highway bridge at East Haddam, Conn., will involve a 450-ft. draw span and two truss spans, one about 325 ft. and the other about 100 ft. in length. The new pier at Atlantic City, it is estimated, will require 3000 tons. The New York Central has asked for bids on 30 signal bridges, totaling 400 tons. Quotations are: Steel bars, 1.31c. to 1.36c.; plain structural material and plates, 1.36c. to 1.41c.; bar iron, 1.30c. to 1.35c., all New York. Plain material from store, New York, 1.70c. to 1.80c.

Cast Iron Pipe.—Private buying continues in satisfactory volume but public lettings are few and unimportant. Low prices continue to be made by some of the pipe foundries, notwithstanding the belief that order books are in much better shape than at the corresponding time in recent years. Carload lots of 6-in. are generally quoted at $22 to $23, tidewater, per net ton, but some makers are still taking business at $21.

Old Material.—The market is strong under the leadership of heavy melting steel scrap. Eastern Pennsylvania consumers have been buying in good quantities. It is understood that some strictly railroad steel scrap brought slightly over $14 delivered in eastern Pennsylvania. Certain classes of rolling mill scrap are in good demand and prices are somewhat higher. Buyers are in the market for old car wheels for New England consumption, but few or none can be picked up in this immediate vicinity. Quotations are as follows, per gross ton, New York and vicinity:

Old girder and T rails for melting	$11.25 to $11.75
Heavy melting steel scrap	11.25 to 11.75
Relaying rails	20.00 to 20.50
Rerolling rails (nominal)	12.00 to 12.50
Iron car axles	21.00 to 21.50
Old steel car axles	15.00 to 15.50
No. 1 railroad wrought	13.50 to 14.00
Wrought iron track scrap	12.50 to 13.00
No. 1 yard wrought, long	11.50 to 12.00
No. 1 yard wrought, short	11.25 to 11.75
Light iron	4.75 to 5.25
Cast borings	7.50 to 8.00
Wrought turnings	8.00 to 8.50
Wrought pipe	10.00 to 10.50
Old car wheels (nominal)	12.00 to 12.50
No. 1 heavy cast, broken up	11.75 to 12.00
Stove plate	9.00 to 9.50
Locomotive grate bars	9.00 to 9.50
Malleable cast	9.50 to 10.00

Ferroalloys.—While $43.50, Baltimore, is quoted as the price of 80 per cent. ferromanganese for forward delivery, sales at that price are only made in some instances subject to confirmation by the makers abroad. It is reported that sales for prompt shipment have been

made up to $50. Some sellers say they expect $45 to $46 to be the price in the near future. They assume that when normal consumption is resumed abroad a shortage will quickly develop because of the impairment of reserve supplies. It is pointed out that while production ceased in England during the coal strike, consumption was going ahead in this country and the effect will be to enhance values. It is held also that ferromanganese should bring a better price than it has recently, and the higher figures of cost in previous years are referred to. There is no special activity in 50 per cent. ferrosilicon, for which $70, Pittsburgh, is quoted, with the usual reductions for large quantities.

Metal Market

NEW YORK, April 24, 1912.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
April.	Lake.	Electrolytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
18	16.00	16.00	43.50	4.20	4.12½	6.95	6.80
19	16.00	15.87½	43.85	4.20	4.12½	6.95	6.80
20	16.00	15.87½	44.00	4.20	4.12½	6.95	6.80
22	16.00	15.87½	44.60	4.20	4.12½	6.95	6.80
23	16.00	15.87½	44.70	4.20	4.12½	7.00	6.85
24	16.00	15.87½	44.75	4.20	4.12½	7.00	6.85

Copper prices are lower for resale lots, with little or no tendency to buy. Tin is firm at higher prices but the demand is light. Lead is easier. Spelter is in good demand and prices are strong. Antimony is unchanged.

New York

Copper.—Although copper producers have adhered to the 16c. level, the metal in resale lots has been offered below that figure in the last week. There has been no pressure to sell and seemingly no anxiety to buy. In the absence of any large demand it may be said that the holders of small lots who are willing to sell below the price of the large interests, or at about 15.87½c., make the market. At the same time if large users of copper were to come forward with heavy demands it is certain they could not get all they wanted at much below the producers' prices. Consumption appears to be going forward at a fair pace and the explanation of the situation is that copper was bought in large quantities and well ahead at the lower prices which have ruled heretofore. Electrolytic copper is quoted to-day at from 15.87½c. to 16.12½c. Lake copper is quoted from 16c. to 16.12½c. The price in London to-day is £70 7s. 6d. for spot and £71 5s. for futures. The exports this month reach the small comparative total of 15,756 tons.

Pig Tin.—The market is firm at higher prices despite the absence of good demand. With the exception of Friday and Saturday of last week, when a good business was done, the week has been very dull. On those two days a business of 600 or 700 tons in positions ranging from spot to October was done, a good part of it between dealers. This activity caused a £3 advance in London on Monday and correspondingly high prices here. It is expected that deliveries into consumption this month will equal or exceed all records. The May 1 statistics will show, it is believed, that at least 5200 tons will have been delivered into consumption in April and some estimates go as high as 5600. The previous record is 5100 tons. Tin is quoted to-day at 44.75c., every day of the week having seen a substantial advance. The price in London is £204 for spot and £200 5s. for futures. The arrivals have been 4820 tons and there is afloat 2370 tons.

Tin Plates.—Conditions abroad have been the cause of a further advance in tin plates laid down at Swansea, Wales, of 3d., the price now being 14s. 4½d. In New York $3.54 continues to be quoted for 100-lb. coke plates.

Lead.—Conditions have been very quiet in the last week, lead having presented many of the aspects of copper and tin. The only feature is an easier market because of independent sellers having cut their prices and a few sales are reported to have been made as low as 4.10c., St. Louis. The New York price is quoted at 4.20c. and the St. Louis market at 4.12½c.

Spelter.—The stronger tendency in spelter noted last week has continued and prices to-day are higher and the metal is even more difficult to obtain. Several large consumers have been sounding the market and in the last two or three days inquiry has been especially active. Consumption is heavier than for some time. Prime Western spelter for prompt and nearby shipment commands 7c. and upward in New York and 6.85c. in St. Louis.

Antimony.—No changes have occurred in antimony within the week. For Cookson's 8c. is quoted, for Hallett's, 7.75c., and for Hungarian and Chinese grades, 7c.

Old Metals.—The market is quiet, but without change in dealers' selling quotations, which are as follows:

	Cents per lb.
Copper, heavy and crucible	14.75 to 15.00
Copper, heavy and wire	14.25 to 15.00
Copper, light and bottoms	13.50 to 13.75
Brass, heavy	9.50 to 9.75
Brass, light	7.75 to 8.00
Heavy machine composition	12.50 to 13.00
Clean brass turnings	9.00 to 9.25
Composition turnings	10.50 to 11.00
Lead, heavy	4.00
Lead, tea	3.75
Zinc, scrap	5.50

Chicago

APRIL 23.—Except on pig tin, for which there is a good inquiry, the demand for metals is normal. Because of the high price of tin, to which 1c. per lb. has been added this week, orders for this product are not as heavy as the volume of inquiry would indicate. Spelter has also advanced. Lead is lower. We quote as follows: Casting copper, 16c.; Lake, 16.25c., in carloads for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, carloads, 45.50c.; small lots, 47.50c.; lead, desilverized, 4.15c. to 4.20c., for 50-ton lots; corroding, 4.40c. to 4.45c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 6.75c. to 6.85c.; Cookson's antimony, 8.50c., and other grades, 7.50c. to 8c., in small lots; sheet zinc is $8.60, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 13.50c.; copper bottoms, 12c.; copper clips, 12.25c.; red brass, 12c.; yellow brass, 10c.; lead pipe, 4c.; zinc, 5c.; pewter, No. 1, 30c.; tinfoil, 38c.; block tin pipe, 40c.

St. Louis

APRIL 22.—Tin is held at 44.25c. and is in good demand. Lake copper stands at 16.30c. and electrolytic at 16.15c., both in fair request. Antimony, Cookson's, is 8.35c. Lead is 4.17½c. asked, with holders seeking more for the metal. Spelter is firm at 6.70c. to 6.75c. for spot and some slight reduction for futures. In the Joplin district the ore producers have held firmly to their insistence on prices, with $56 the high figure on a 60 per cent. basis and $58 as the highest price paid for extra choice lots. Calamine is well held at $26 to $28 for 40 per cent. and choicest lots reaching as high as $32. Lead ore brought as high as $57 for the best offerings. On miscellaneous scrap we quote as follows: Light brass, 5c.; heavy brass and light copper, 9c.; heavy copper and copper wire, 10c.; zinc, 3.50c.; lead, 3.50c.; tinfoil, 31c.; pewter, 21c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, April 24, 1912.

The upward course of stocks met with some slight reverses since last week's report, and in but few instances were the maximum prices of the previous week surpassed or even equalled. Notable exceptions were the stocks of the American Company and Bethlehem Steel Company. Bethlehem preferred made a remarkable spurt on Friday, while the common stock sold at the highest point on Saturday that it had ever attained. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chalm., com...	1⅛- 1⅜	Pressed Steel, com..	34 - 35½
Allis-Chalm., pref...	3½- 4½	Pressed Steel, pref..	102¼-103
Bald. Loco., com...	53½- 55	Railway Spring, com.	32⅝- 34¼
Bald. Loco., pref...	106 -106½	Railway Spring, pref.	100
Beth. Steel, com...	35½- 41¼	Republic, com.	23 - 24⅛
Beth. Steel, pref....	62½- 74¼	Republic, pref.	77½- 78¾
Can, com.	32½- 35½	Sloss, com.	47 -48
Can, pref.	115¼-117	Pipe, com.	17⅛- 18½
Car & Fdry, com...	58¾- 60¼	Pipe, pref.	54⅜- 57½
Car & Fdry., pref...	116½-118½	U. S. Steel, com....	69¾- 72
Steel Foundries....	34¼- 35⅝	U. S. Steel, pref...	112¼-112⅞
Colorado Fuel.....	29½- 31	Westinghouse Elec..	75 - 77¼
General Electric....	169¼-171½	Va. I. C. & Coke...	64 - 66
Gr. N. Ore Cert....	39¼- 41	Am. Ship, com.	57 - 57¼
Int. Harv., com....	116 -118½	Am. Ship, pref.	102½
Int. Harvester, pref.	121	Chic. Pneu. Tool...	47½- 48½
Int. Pump, com....	29 - 30¼	Cambria Steel.....	43½- 44¼
Int. Pump, pref.	83	Lake Sup. Corp....	30¾- 32
Locomotive, com....	42 - 43¾	Warwick	10½- 10⅝
Locomotive, pref.	100	Crucible Steel, com.	12¼- 12⅝
Nat. En. & St., com.	16 - 16¼	Crucible Steel, pref.	83 - 84
Nat. En. & St., pref.	94		

Dividends Declared

The Cambria Steel Company, regular quarterly, 1¼ per cent., payable May 15.

The National Lead Company, regular quarterly, 1¾ per cent. on the preferred stock, payable June 15.

The J. G. Brill Company, regular quarterly, 1¾ per cent. on the preferred stock, payable May 1.

The Pope Manufacturing Company, regular quarterly, 1½ per cent. on the preferred stock, payable April 30.

The Pennsylvania Steel Company, regular semi-annual, 3½ per cent. on the preferred stock, payable May 1.

Iron and Steel Institute Annual Meeting

At the annual meeting of the Iron and Steel Institute at London May 9 and 10 the Bessemer gold medal will be presented to J. H. Darby, director of the Brymbo Steel Company, Brymbo, England, and a member of the council of the institute. The following papers are scheduled for the meeting:

"Notes on the Solubility of Cementite in Hardenite," by Dr. J. O. Arnold and L. Aitchison.

"The Chemical and Mechanical Relations of Iron, Vanadium and Carbon," by Dr. J. O. Arnold, and Prof. A. A. Read.

"Notes on a Bloom of Roman Iron from Corstopitum (Corbridge)," by Sir Hugh Bell.

"The Influence of Carbon on Corrosion," by C. Chappell.

"The Manufacture and Treatment of Steel for Guns," by General L. Cubillo.

"The Corrosion of Nickel, Chromium, and Nickel-Chromium Steels," by Dr. J. N. Friend, J. Lloyd Bentley and W. West.

"The Mechanism of Corrosion," by Dr. J. N. Friend, W. West and J. Lloyd Bentley.

"Sinhalese Iron and Steel of Ancient Origin," by Sir Robert A. Hadfield.

"Modern Rolling-Mill Practice," by J. W. Hall.

"The Influence of Heat on Hardened Tool Steels," by E. G. Herbert.

"Improvements in Electric Steel Furnaces and Their Application in the Manufacture of Steel," by Dr. H. Nathusius.

"A New Process for the Investigation of Fractured Surfaces of Steel," by F. Rogers.

"The Welding up of Blowholes and Cavities in Steel Ingots," by Dr. J. E. Stead.

"Note on Some Remains of Early Iron Manufacture in Staffordshire," by Prof. T. Turner.

Customs Decisions

Generator Shafts

In defining the status of generator shafts of steel, the Board of United States General Appraisers holds that such shafts are to be regarded as dutiable at the rate of 45 per cent. under the terms of the tariff act of 1897, as "manufactures of metal," and not at lower rates as claimed by the importers. Thomas Prosser & Son are the importers of the shafts in question, but they are intended for the use of the Calumet & Hecla Mining Company. Each shaft weighs about 37,000 lb., and is a forging, rough bored and rough turned, about 19 ft. in length.

The importers objected to the classification of 45 per cent. imposed by the customs authorities at New York and set up several contentions for rates lower than those assessed. They were alleged to be dutiable at the appropriate rate according to value per pound under paragraph 135 as "mill shaftings," or under the same paragraph as "steel in all forms and shapes not specially provided for," or at 35 per cent. as "steel forgings" under paragraph 127. Judge Fischer, who writes the decision for the board, analyzes the various claims made for a reduction in the classification, and, after quoting former tariff acts and judicial authorities, reaches the conclusion that the imposition of duty at 45 per cent. as "manufactures of metal" is correct and must stand. The protest is therefore overruled.

Old Iron Shafting

The Government, in a brief filed by Thomas J. Doherty, of the Department of Justice, has asked the Customs Court of Appeals to hold that under the tariff act of 1909 all scrap or wrought iron be held dutiable at the rate of $1 per ton under the terms of paragraph 118. The issue now before the court results from a decision of the Board of General Appraisers in the case of A. D. Strauss & Co., relating to the classification of old iron shafting in pieces varying from 24 in. to 14 or 15 ft. The customs authorities reported that the articles may be rerolled or hammered, and are better than scrap iron fit only for remanufacture by melting. Duty was accordingly taken at the rate of 45 per cent. under the provisions of paragraph 199 of the present law specifying "manufactures of metal." The importers alleged that the merchandise is free of duty under paragraph 600 as "junk," or dutiable as scrap iron under paragraph 118. Other claims were made also.

After a hearing, the general board brought in a verdict in favor of the protestants. This has now been carried on appeal by the Government to the customs court in view of the fact that the board held the merchandise is entitled to exemption from duty as "junk." It is maintained in the Government's brief that it is manifest that the phrase "wrought and cast scrap iron," as appearing in paragraph 118, exhausts the class of scrap iron. The basis of this claim is that there are only two varieties of iron, cast and wrought, and as cast scrap is the only kind that can never be remanufactured, except by melting, the phrase "fit only to be remanufactured by melting" can, in its literal sense, attach to no other. The court is asked to reverse the decision of the Board of Appraisers.

Copper Vessels as Containers

The board sustained a contention raised by George Lueders & Co., relating to the classification of round copper vessels of about 25 lb. capacity used in the transportation of oil of lemon, bergamot and orange. The copper containers were returned for duty at the rate of 30 per cent. under the act of 1909, as cylindrical or tubular vessels. It was claimed by the importers that the containers are the "usual" coverings of the merchandise and as such exempt from duty. Judge Fischer holds that the coverings for the oil of lemon and bergamot are the ordinary containers of the commodities, designed to merely transport the merchandise and useless after the contents are removed.

Cast-Iron Grinding Disks

The board has decided that cast-iron grinding disks, imported by Thomas Prosser & Co., are not dutiable under the tariff act of 1909 at the rate of 45 per cent., but may enter as "castings" at 8/10 of 1 cent a pound plus 2/10 of a cent under the terms of paragraph 147. The collector's high assessment is reversed, the protest being sustained.

Steel Metal Drums

Another ruling favorable to the contention of importers was that relating to sheet metal drums containing bleaching powder imported by A. Klipstein & Co. The drums were classified under paragraph 151 of the present tariff act as metal coverings and as such dutiable at the rate of 30 per cent. The customs authorities deemed the articles to be unusual coverings whereas the importers alleged them free of duty as "usual." The claim is sustained and the collector reversed. It was decided that iron drums imported by Robert B. Ways of the Baltimore & Ohio Railroad Company, F. H. Shallus and Arthur W. Robson are not usual covering and hence dutiable. Certain receptacles imported by Charles Timson and others are granted free entry.

Lacquered Tin Boxes

It is decided that lacquered tin boxes containing paints imported by Wilfred Schade & Co., are not containers, subject to duty at the same ad valorem rates as the paints. Duty was taken under the tariff provision for "containers" at the rate of 4 cents a pound and 35 per cent. on the value. The board finds the protest to be without merit, the collector being affirmed.

Bureau of Standards Analyzed Samples.—The Bureau of Standards, Washington, D. C., is now ready to distribute certain special steels, as follows: No. 30, chrome-vanadium; No. 32, chrome-nickel; No. 33, nickel. The fee for these steels will be $2.50 each. A renewal of No. 19 acid open-hearth steel, 0.2 carbon, will probably be ready this week. Until printed certificates can be had, the above steels will be issued with provisional certificates without details of analyses or description of methods.

Pittsburgh and Vicinity Business Notes

The Westinghouse Electric & Mfg. Company, Pittsburgh, has received an order from the Southern Pacific Company, Oakland, Cal., for one 60-ton locomotive, equipped with four No. 308 motors and HL USG control, and an order from the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for one seven-ton locomotive equipped with two No. V-49 motors and K-45 control.

The report that the American Sheet & Tin Plate Company will make an addition of 10 hot tin mills to its plant at South Sharon, Pa., is officially denied.

The Traffic Club of Pittsburgh is distributing a pamphlet giving the proceedings of its tenth annual dinner, March 28, including the addresses of Edward T. Jeffrey and Charles A. Prouty, chairman of the Interstate Commerce Commission.

The concrete warehouse and office building of Spang, Chalfant & Co., Inc., under erection at Sharpsburg, Pa., and which collapsed some time ago, is being rebuilt by Henry Shenk & Co., Pittsburgh.

The Garland Nut & Rivet Company, Pittsburgh, has contracts pending with the Chilean Government for 10 carloads of cold punched and semi-finished nuts, and has inquiries for material from Liverpool, Birmingham and Manchester, England. It is sending large quantities of rivets to the United States navy yards at Brooklyn, N. Y., and Mare Island, Cal.

Boyts-Porter & Co., Connellsville, Pa., have received an order for six steam pumps to be used in steamers now being built for South American trade by James Rees & Sons, Pittsburgh.

Plans have been drawn by Janssen & Abbott, architects, Renshaw Building, Pittsburgh, for a five-story addition to the Fort Pitt Hotel in that city, which will require about 500 tons of steel.

The Connellsville Iron Works, Connellsville, Pa., is building 60 steel mine cars for the Donahue Coke Company, Greensburg, Pa., and a steel water tank for the Waterbury Mfg. Company, Waterbury, Conn.

The Burry Compressor Company, Erie, Pa., has recently placed on the market a variable volume air compressor for direct connected and belt drive. Recent sales made by the company's Pittsburgh office include the following: United Steel Company, Canton, Ohio, duplicate order for 150-hp. steam-driven unit; Wheeling Mold & Foundry Company, Wheeling, W. Va., 600-ft. two-gauge belt-driven machine.

The Buckeye Aluminum Company, Doylestown, Ohio, has filed notice of an increase in its capital stock from $100,000 to $150,000 and will change its location from Doylestown to Wooster, Ohio.

The Warren Axe & Tool Company, Warren, Pa., has voted to increase its capital stock to $200,000. It is probable that in the near future it will make some large additions to its plant.

The Westinghouse Machine Company, East Pittsburgh, has filed notice of an increase of debt from $865,000 to $1,135,000. The special meeting of the stockholders which was to have been held April 19 has been postponed until May 9. Officials of the company say that increased orders booked the past two months encourage the programme for rehabilitating its finances beyond the point of any possible weakness.

The Aluminum Company of America, New Kensington, Pa., denies the report that it will build two large mills.

The Pittsburgh Steel Specialties Company, Pittsburgh, has filed a petition for dissolution.

The Belden Engineering Company, Pittsburgh, has filed notice of an increase in its capital stock, from $25,000 to $50,000.

The West Penn Steel Company, Brackenridge, Pa., is increasing the capacity of its power plant by the addition of electrical equipment comprising one 1875-kva. turbo-generator, one 25-kw. turbo-generator, one 720-kw. motor-generator set, three 50-kva. transformers, one 150-hp motor, one 750-hp. motor and switchboard. All apparatus is being furnished by the General Electric Company.

The Hoskins Mfg. Company, Detroit, Mich., maker of Hoskins electric furnaces, pyrometers and heating appliances and International electric meters, has opened a Pittsburgh office in the Oliver Building. This office will enable the company to more adequately care for its rapidly growing business in the district.

The United States Enameling Company, Moundsville, W. Va., has been incorporated with a capital stock of $10,000 to manufacture sheet metal, enameled goods and galvanized iron. E. L. Evans, W. T. Hughes and R. D. Hughes are the incorporators.

The Bickford Fire Brick Company has moved its offices from the works of Curwensville, Pa., to Room 2106 First National Bank Building, Pittsburgh.

The Pittsburgh office of the Cutler-Hammer Mfg. Company, Milwaukee, Wis., has received an order from the Alliance Machine Company, Alliance, Ohio, for one 75-ton and two 150-ton electric ladle cranes to be installed in the new open-hearth steel plant of the Pittsburgh Crucible Steel Company at Midland, Pa.

The sale of the plant of the Scott Iron & Steel Company, Carnegie, Pa., which was to have taken place April 17, was postponed for two weeks, the bids not being satisfactory to the receiver.

The Cleveland Electric Illuminating Company, Cleveland, has placed a contract with the Westinghouse Machine Company, Pittsburgh, for two 6000-hp. steam turbines to drive two 6000-hp. direct current generators.

The Duff Mfg. Company, Pittsburgh, manufacturer of hydraulic jacks and other lifting devices, has made plans for the building of a new plant, but may not proceed with it for some little time.

The Valley Mold & Iron Company, Sharpsville, Pa., is now supplying the largest number of steel companies with ingot molds than ever before in its history. Several important steel companies have in the past few years abandoned the manufacture of molds and are having them made by the Valley Company, which is planning to increase its capacity but has not yet asked for bids on any new construction.

Wrought Pipe Jobbers at Atlantic City

The annual meeting of the National Association of Jobbers of Wrought Iron Pipe and Fittings convened at the Hotel Shelburne, Atlantic City, N. J., on Monday and Tuesday of this week. After an address of welcome by President Charles Simmons and hearing the reports of the officers and committees and attending to the routine business of the organization, the jobbers devoted their attention to the various important matters all planned to conserve the best interests of the trade at large. The centers of interest were around the papers given by A. E. Ford, Philadelphia, and Clarence V. Kellogg, Chicago. The subject of Mr. Ford's paper was "Manufacturers' Competition and the Way to Meet It." The paper by Mr. Kellogg was entitled "Organized Effort of Distributers of Steam Supplies."

The annual report of President Charles Simmons covered the work of the year. At the Tuesday afternoon session officers for the ensuing year were elected as follows: President, J. T. Hartnett, L. M. Rumsey Manufacturing Company, St. Louis, Mo.; first vice-president, A. L. Scott, Pacific Hardware & Steel Company, San Francisco, Cal.; second vice-president, C. V. Kellogg, Kellogg-Mackay Company, Chicago, Ill.; treasurer, C. G. Cornell, Jr., Cornell & Underhill, New York City. Executive Committee: F. M. Sheldon, Braman, Dow & Co., Boston, Mass.; George V. Denny, Savannah, Ga.; J. B. Rahn, U. S. Supply Company, Omaha, Neb.; W. M. Pattison, W. M. Pattison Supply Company, Cleveland, Ohio; S. H. Moon, Ahrens-Ott Manufacturing Company, Louisville, Ky.; W. T. Cobb, Pittsburgh, Pa. Advisory Committee, made up of retired presidents: A. E. Ford, Philadelphia, and Charles Simmons, New York City. On Tuesday evening the jobbers and friends made up a theater party and were entertained at one of the local theaters.

The fortnightly bulletin of the American Railway Association gives the net surplus of idle cars on all lines in the United States and Canada on April 11 as 79,389, as against 18,708 two weeks previous, an increase of 60,681. The increase was in large part due to the release of cars loaded with coal which were held up as storage receptacles in the latter part of March in anticipation of a strike.

F. C. Caldwell

Retiring President of the National Metal Trades Association

For several years a member of the Administrative Council of the National Metal Trades Association, F. C. Caldwell of H. W. Caldwell & Son Company, Chicago, has been its president in the past year, his term ending with the close of the annual convention in New York City, April 11. During Mr. Caldwell's administration further progress was made in the association's work in safeguarding employees from accident and in otherwise improving

working conditions. Mr. Caldwell's attitude on these matters is indicated in this sentence from his presidential address: "If there is any one thing that should be constantly before us as members of this association it is that the very power that the association undoubtedly possesses should be used to its fullest extent to make the condition of the men in our industry better than it possibly could be without the existence of our association."

Mr. Caldwell's company is also a member of the National Founders' Association and he is on that association's District Committee for the Fourth District.

Personal

Shirley S. French has been appointed chief clerk of the mill offices of the Brier Hill Steel Company, Youngstown, Ohio, to take effect May 1. He was formerly in the clerical department of the Republic Iron & Steel Company at Pittsburgh and Toledo, then with the United States Steel Corporation at Gary and latterly chief clerk at the H. Koppers by-products coke ovens at Gary.

W. H. Hamilton, general manager of the Lukens Iron & Steel Company's plant at Coatesville, Pa., addressed a meeting of railroad master mechanics in Boston, April 23, on the A B C of steel making.

Dr. Richard Borchers, Duisburg-Ruhrort, Germany, is in the United States for the purpose of making a special study of loading and unloading machinery.

C. C. Smith has been elected secretary of the Wambold Mfg. Company, Milwaukee, manufacturer of machinery for paper and pulp mills. Mr. Smith recently sold his interest in the Smith & Holtum Mfg. Company, Clinton, Wis., of which he was secretary and general manager.

P. O. Menke, superintendent of the Cleveland Furnace Company's blast furnaces at Cleveland, resigned recently to become furnace superintendent of the Shenango Furnace Company, Sharpsville, Pa.

M. C. Armour, of Rogers, Brown & Co., Chicago, returned this week from a stay in California.

Reginald P. Dryer, formerly in charge of sales of the William Tod Company, Youngstown, Ohio, builder of engines and rolling mill equipment, has resigned to become sales manager of the Canada Foundry Company, Toronto, Canada.

J. W. Henderson has resigned as manager of the Verona Steel Casting Company, Verona, Pa.

L. H. Burnett has been appointed assistant to President A. C. Dinkey of the Carnegie Steel Company, Pittsburgh, and in addition to the duties heretofore performed by him as assistant to the second vice-president will have charge of the accident and relief bureaus, succeeding Geo. K. Preston, resigned.

W. H. Sherwin, who for the past 10 years has been the Northwestern representative of Joseph T. Ryerson & Son, Chicago, having his office at Minneapolis, has resigned to become general manager and vice-president of the Alberta-American Ornamental Iron Company, Redcliff, Alberta. This company is successor to the American Ornamental Iron & Steel Company, Minneapolis, Minn., which is moving its entire plant to Redcliff and expects to add to its equipment to put it in a position to handle the business in this rapidly developing country.

Cecil P. Poole, who has been the junior editor-in-chief of our contemporary, Power, for the past seven years, has severed his connection with that paper and will engage May 1 in consulting engineering in Atlanta, Ga., in partnership with Lamar Lyndon of 60 Broadway, New York. The firm will operate as the southern branch of Mr. Lyndon's New York office, which will continue as heretofore. The Atlanta office will be conducted by Mr. Poole. For the past dozen years Mr. Poole has made a special study of electrical machine construction and of gas power engineering, and his knowledge of these branches of engineering should be of great assistance in his new work. He is widely known as a writer on both subjects and is a member of the American Institute of Electrical Engineers and of the American Society of Mechanical Engineers.

E. M. McIlvain, president of the Lehigh Coke Company, New York, sailed for Europe last week.

Paul Kreuzpointner, who had been for thirty-two years years in the employ of the Pennsylvania Railroad Company at Altoona, Pa., retired recently at the age of 70, and his name was added to the company's pension rolls. Mr. Kreuzpointner is well known as a metallurgist and testing engineer, particularly in connection with the American Foundrymen's Association and the American Society for Testing Materials. In the former organization he had been for a number of years chairman of the Committee on Apprenticeship, presenting a number of reports which dealt particularly with industrial education. He had made a special study of the German system of continuation schools, and in this country had visited and reported on a number of manual training and industrial high schools. Mr. Kreuzpointner served as a machinist in the early period of his employment by the Pennsylvania Railroad Company, but soon after was transferred to the testing department. He will continue his activities in connection with the various associations of which he is a member.

E. H. Martin has resigned as manager of the steel department of the Upson Nut Company, Cleveland. Willard Fuller, who has been blast furnace superintendent of the company, has been appointed as his successor.

Benjamin F. Guiney, for the past 12 years secretary of the Water Board of Detroit, Mich., has resigned to take a similar executive position with the Michigan Smelting & Refining Company.

Edward L. Parker, of the Columbia Steel & Shafting Company, Pittsburgh, has gone to the West Indies.

William Warner Justice, Jr., was admitted as a partner in the tin-plate manufacturing firm of N. & G. Taylor Company, Philadelphia, Pa., on April 1, 1912.

B. H. Tripp, who has been engaged in special work for the Chicago Pneumatic Tool Company, Chicago, Ill., with headquarters in its Philadelphia office, has been appointed New England district manager for that company, with headquarters at 191 High street, Boston.

B. C. Moise, recently appointed secretary of the National Tube Company, Pittsburgh, has also been appointed a director, succeeding J. D. Culbertson, deceased. The directors are now as follows: E. H. Gary, J. A. Farrell,

W. B. Schiller, Richard Trimble, E. C. Converse, Thomas Murray, Edward Worcester, Taylor Allderdice and B. C. Moise.

E. Francis, formerly of the Pennsylvania Steel Company, and now superintendent of the Titan Steel Casting Company, Newark, N. J., was injured a few weeks ago but has recovered and again taken up his duties.

Charles M. Schwab, president of the Bethlehem Steel Company, and Henry S. Snyder, vice-president, have gone to California on business connected with the Union Iron Works, San Francisco.

L. A. Woodard, for some years works manager of the William Tod Company, Youngstown, Ohio, has been elected vice-president and general manager.

Obituary

George D. Wick

Among those who lost their lives in the sinking of the Titanic was Col. George D. Wick, the well-known manufacturer and capitalist of Youngstown, Ohio, who had been touring Europe with his wife and daughter and Miss Bonnell of Youngstown, and was returning home. His wife, daughter and Miss Bonnell were saved, but like other brave men who went down in that terrible catastrophe, Colonel Wick refused to leave the vessel, seeing to it that his wife, daughter and Miss Bonnell were put into the life boats. Mr. Wick was born in Youngstown, Ohio, June 24, 1854, and was the son of Paul and Susan A. Wick. He was a graduate of Williams College of the class of 1876, and his active business life started with that year. In 1882 he became president of the Trumbull Iron Company, Girard, Ohio. In 1892 he was made vice-president of the Union Iron & Steel Company, Youngstown, and in 1896 became president of the Mahoning Valley Iron Company. When this company was taken over by the Republic Iron & Steel Company, he was made first vice-president of the latter. He largely organized the Youngstown Sheet & Tube Company of Youngstown, Ohio, and

GEORGE D. WICK

was elected president, but in 1903 he retired from active business. At his death he was vice-president of the First National Bank, the Dollar Savings & Trust Company at Youngstown, director and member of the Advisory Committee of the Youngstown Sheet & Tube Company, president and director of the Empire Iron & Steel Company, (recently merged in the Brier Hill Steel Company), the Garry Iron & Steel Company, the Federal Building Company, and the Paul Wick Real Estate Company, director of the Wick Building Company and the Youngstown Securities Company. In the incumbency of the late Governor Bushnell of Ohio he was a member of the Governor's staff. Probably no man had more to do with the building up of the industries of the Mahoning Valley, and no man stood higher in the personal regard of the citizens of Youngstown, and, in fact, of all his friends. In honor of Colonel Wick every express and railroad office in Youngstown suspended operations for a period of five minutes between 10 and 10:05 Saturday morning, April 20, and during that time many of the officials of the concerns personally addressed their employees, eulogizing Colonel Wick and relating interesting experiences of their contact with him. Arrangements are also being made whereby a 10 or 15-minute period will be set aside on one day this week when all the manufacturing plants in the Mahoning Valley will cease operations, the street cars will be halted and the church bells tolled as a mark of respect to his memory. A mayor's' committee has also been appointed, consisting of J. A. Campbell, J. G. Butler, Jr., and A. E. Adams, who will consult with Mrs. Wick in connection with a proposed memorial meeting.

Benjamin Guggenheim

A portrait is herewith presented of Benjamin Guggenheim, late president of the International Steam Pump Company, New York. It is now established beyond doubt that he perished when the Titanic foundered April 15. He

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BENJAMIN GUGGENHEIM

was one of the heroes of that most trying period when men voluntarily remained with the sinking ship instead of forcing women and children to give them places on the pitifully small number of boats. Mr. Guggenheim was in the prime of life, being but 47 years of age.

Ernst A. Sjostedt

ERNST A. SJOSTEDT, one of those reported lost in the sinking of the Titanic on the morning of April 15, was born at Hjo, Sweden, in 1852 and received his early education at Skara. After graduating in 1876 from the School of Mines at Stockholm he went to Le Creusot, France, and then to the works of the Bethlehem Steel Company at South Bethlehem, Pa., where he occupied the position of assistant chemist. Later he was associated with John Birkinbine. His next work was the carrying on of a series of experiments in the roasting of iron ores at Katahdin, Maine, and he subsequently was in charge of the charcoal iron furnaces at Shelby, Ala., and Cherokee, Ga., for five years. Returning to Maine, he rebuilt the Katahdin fur-

naces and remained there as superintendent for five years. He then organized the Pictou Charcoal Company in Nova Scotia and acted as manager during the next six years. In 1897 he established himself in Montreal, making a specialty of the design of roasting furnaces and gas producers and the utilization of peat and mill refuse. Two years later he became the chief metallurgist of the Consolidated Lake Superior Copper Company at Sault Ste. Marie, Ont. Mr. Sjostedt was a contributor to numerous technical publications and among his printed papers was one on the utilization of peat written for the 1899 volume of the Mineral Industry and a description of a new charcoal retort plant of the Algoma Steel Company which appeared in *The Iron Age*, January 28, 1904. He was also the inventor of the roasting furnace bearing his name, which was designed for producing ferronickel directly from pyrrhotite. It was illustrated in these columns February 18, 1904. He built the reduction works and the water gas plant at Sault Ste. Marie. About three months ago Mr. Sjostedt was sent abroad in the interest of the Lake Superior Corporation and the Dominion Government and was returning from this trip through England and the Continent. He leaves a widow. Mr. Sjostedt had been a member of the American Institute of Mining Engineers since 1893.

JOHN F. MILLS, vice-president of Abendroth Brothers, Port Chester, N. Y., died April 9 of pneumonia, aged 43 years. He had been active for a number of years in the manufacture of stoves, boilers and soil pipe. More recently he had taken part in the general management of the business, and was in charge of the soil pipe branch. Mr. Mills had frequently represented his company in foundry association meetings. He leaves a widow, a son and a daughter.

JACOB E. FRIEND, president Nordberg Mfg. Company, an extensive builder of engines and refrigerating machinery, Milwaukee, Wis., died April 20, at Florence, Italy. He was making a tour of Europe for the benefit of his health.

HORACE J. STEVENS, who has become widely known in the copper trade in the past 10 years as editor and publisher of the "Copper Handbook," died suddenly of heart disease at Ishpeming, Mich., Monday, April 22, aged 48 years.

American Iron and Steel Statistics

The appearance of the steel statistics for 1911 enables us to present the following interesting table of United States production for the past five years in three leading branches of the trade, all quantities representing tons of 2240 lb.:

Years.	Pig iron.	Steel ingots and direct castings.	All kinds of rails.
1907	25,781,361	23,362,594	3,633,654
1908	15,936,018	14,023,247	1,921,015
1909	25,795,471	23,955,021	3,023,845
1910	27,303,567	26,094,919	3,636,031
1911	23,649,344	23,675,501	2,822,790

Bethlehem Steel Company Financing.—In New York banking circles some information has been given out in the past week concerning a bond issue which is expected to be authorized by the Bethlehem Steel Company at a special meeting on May 15. It is stated that from the proceeds of the sale of $15,200,000 of bonds the $6,500,000 notes are to be taken up and $3,500,000 of floating debt liquidated. The balance is to be used for extensions and addition to working capital.

At the annual meeting of the stockholders of the Joseph Dixon Crucible Company, Jersey City, N. J., April 15, the retiring board of directors, consisting of George T. Smith, William Murray, Edward L. Young, William H. Corbin, George E. Long, William G. Bumsted and Harry Dailey, was unanimously reelected. Officers chosen for the ensuing year are as follow: President, George T. Smith; vice-president, W. H. Corbin; treasurer, George E. Long; secretary, Harry Dailey; assistant treasurer and assistant secretary, J. H. Schermerhorn.

Founders' Day exercises in the Carnegie Institute, Pittsburgh, were held April 25. At the same time the corner stone of the School of Applied Design was laid, Andrew Carnegie having donated $1,000,000 for the construction of this building.

The Steel Rail Committee.—The rail committee of six, three railroad presidents and three presidents of steel companies, charged with preparing a report for the general committee of railroad officers and steel manufacturers appointed a meeting for April 19 at the office of Chairman Gary, of the Steel Corporation. Due to pending railroad labor matters, however, there was not a quorum of the railroad representatives. An appointment will probably be made for a meeting early in May.

The American Sheet & Tin Plate Company has issued a circular calling the attention of buyers and users of terne plates to an important improvement it has made in the manufacture of this class of product. After a series of exhaustive service tests in various parts of the country, extending over a long period, it has determined to make all its roofing terne plates, including its well-known MF brand, from the best grade of copper-bearing open-hearth steel. The circular makes the following statement: "We might add for the benefit of those who believe in the acid test as a measure of corrosion that our copper-bearing open-hearth steel ternes will withstand this test equally as well if not better than any of the so-called 'irons.'"

The April issue of the Valve World is a memorial number in honor of the late Richard Teller Crane, who was president and founder of the company bearing his name. It bears evidence of unusual and more than respectful care in its preparation. The entire contents are devoted to the personality of Mr. Crane as iron master, as the builder of a great business, as an educator and as a man who loved his home and the men about him. Much that is of broad and public interest may be found in the pages of this number.

The H. Koppers Company has recently distributed a convenient leather binder for the filing of the monthly brochures it is issuing, the page size being 10½ x 8¼ in. The series began with January, 1912. The title of the April number is "Koppers Horizontal Cross Regenerative By-Product Combination Coke and Gas Oven." Sectional illustrations of this type of oven are given and a view of a gas plant of 35 such ovens under construction for the Coal Products Mfg. Company at Joliet, Ill.

The formal breaking of ground for the construction at St. Louis of the Busch-Sulzer Bros-Diesel Engine Company's plant took place the past week, the exercises being participated in by Dr. Rudolph Diesel, the inventor, who had come from Germany for the purpose. The plant will cost $500,000. The site cost $350,000.

The Lake Superior Iron Ore Association, Rockefeller Building, Cleveland, has published its booklet for 1912, giving complete average cargo analyses of Lake Superior iron ores for the shipments of 1911. In the case of a number of new ores the expected analyses for the season of 1912 are given.

The Federal Steel Foundry Company, Chester, Pa., officially denies the report that it has taken control of the property of the Vulcan Iron Works. The company states, however, that it contemplates extensive improvements to its plant which include a new pattern storage building and a modern system of trackage for outdoor shop handling of ingoing and outgoing material.

The Weber Chimney Company, builder of reinforced concrete chimneys, Chicago, has found it necessary to take larger office quarters to meet the requirements of its growing business and has removed from 209 South State street to 1452-1456 McCormick Building.

The Scranton Bolt & Nut Company has moved its New York office, C. E. Brodhead, Jr., New York manager, to new quarters on the seventeenth floor of the West Street Building, 90 West street, New York.

The annual convention of the Sons of Vulcan, composed of puddlers in the Pittsburgh and eastern Ohio districts, will be held in Youngstown, commencing May 7.

Trade Publications

Elevating Truck.—Tapley Specialty Company, 531 West Thirty-seventh street, New York City. Mailing card. Calls attention to an elevating truck which is designed for use with a set of platforms for handling material of various kinds. In use the truck is run under the platform and the load transferred by raising the platform of the truck so that the stationary platform is lifted from its two supports.

Molding Machines.—Henry E. Pridmore, Nineteenth and Rockwell streets, Chicago, Ill. Circular. Covers the various types of rock-over drop molding machines manufactured by this company. Some of the advantages claimed for these machines are automatic adjustment for crooked bottom boards, variation in the thickness of bottom boards and depth of flasks; supporting the weight of the flask and mold by arms acting in conjunction with the flask balance springs and the use of adjustable clamping rods. The illustrations show the various types of machines as well as the successive stages in the operation of one of the machines. An illustrated description of one of these machines appeared in *The Iron Age*, November 10, 1910.

Rheostats and Electric Controlling Apparatus.—Allen-Bradley Company, Milwaukee, Wis. Perpetual loose leaf catalogue. Concerned with a line of resistence units in which resistence is controlled by the compression of a stack of graphite disks. The electric controlling apparatus includes motor starting rheostats and panels, direct-current mill and crane controllers and starting rheostats for slip-ring and squirrel-cage motors. The different devices are illustrated and tables of dimensions are included. Illustrated descriptions of the resistances and the motor-starting rheostats appeared in *The Iron Age*, September 22, 1910, and September 21, 1911, respectively.

Shears, Rolling Mill Machinery and Coil Clutches.—Farrell Foundry & Machine Company, Ansonia, Conn. Three bulletins. Contain illustrations and brief descriptions of the various types of alligator, vertical and trimming shears; chilled rolls and heavy machinery and friction clutches built by this company. As far as possible, one leaf is devoted to each machine, the description and table of specifications being given at the bottom of the sheet. In the case of the clutches, line drawings and complete dimensions tables are included.

Die-Sets.—J. M. Carpenter Tap & Die Company, Pawtucket, R. I. Four circulars. Describe the screw plate, small round and full mounted die sets and the adjustable die stock sets manufactured by this company. A list of the different kinds of sets which can be furnished are given in each circular.

Oxy-Acetylene Welding and Cutting Apparatus.—Delcampe Welding Company, Bridgeport, Conn. Pamphlet. Pertains to the line of stationary and portable welding and cutting machines built by this company. These machines are designed for general repair work as well as commercial welding and cutting and the various styles are illustrated with a brief text description on the facing tables. Following this the two types of blow pipes and the oxygen and the acetylene generators are described at some length.

Mechanical Lubricators.—Sterling Machine Company, Norwich, Conn. Bulletin No. 104. Illustrates the improved Sterling mechanical lubricator, which is designed for general internal lubrication. This device is made with multiple feeds and can be applied to any type of steam engine or pump, air compressor, single-acting gas engine or any machinery requiring oil feeds under pressure. The operation of the device is explained at length, the text being supplemented by a line drawing and the check valves and oil feed indicator, which are the two important parts of the lubricator, are shown and described.

Iron Cocks.—Kelly & Jones Company, Greensburg, Pa. Leaflet. Shows the various types of two and three-way iron cocks which this company manufactures. These fittings are supplied with either screwed or flanged ends and a square or flat head. Tables giving the various sizes made, together with the dimensions and prices, are included.

Recording Instruments.—Bristol Company, Waterbury, Conn. Bulletin No. 161. Covers a line of recording instruments which includes indicating and recording pyrometers, recording voltmeters, ammeters, wattmeters and a milli-voltmeter, recording water level, pressure and pressure and vacuum gauges and three styles of recording thermometers, one of which is self-contained. An illustrated description of the class III recording thermometer appeared in *The Iron Age*, January 19, 1911.

Rivets.—Inland Steel Company, Chicago, Ill. Pamphlet. Pertains to the line of extra soft open-hearth steel rivets which this company is prepared to furnish in sizes ranging from ⅛ to 1½ in. in diameter and ranging in length from ¾ to 11½ in. These are supplied with either button, cone, steeple or countersunk heads. The standard specifications for extra soft rivet steel are given and this is followed by a number of illustrations of the tests showing the quality of the steel used. Tables of the weight per hundred rivets are given together with a table of dimensions of the different styles of heads.

Steel Mill Motors.—Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa. Leaflet No. 2383. Illustrates and describes the type MA alternating-current steel mill motor which is designed to withstand severe service in iron and steel mills, brick plants, cement mills and similar industries. Detailed views of the parts are given together with a diagram of the rotor and bearing housing and a view showing the manner of lifting the rotor from the frame.

Bearings.—Metaline Company, West avenue and Third street, Long Island City, N. Y. Catalogue. Concerned with the various types of Metaline or oilless bearings which this company manufactures. The advantages of Metaline and its application to bearings are discussed and a number of illustrations of different types of bearings are included.

Coke and Gas Ovens.—H. Koppers, Joliet, Ill. Pamphlet. Contains a description of the construction and operation of the Kopper's coke and gas ovens with illustrations of the 280-oven plant of the United States Steel Corporation at Joliet, Ill. This installation includes both by-product regenerative coke and gas ovens as well as a patent by-product plant for recovering ammonia from coke gas in the form of ammonium sulphate. A brief mention is made of a non-regenerative oven, and a partial list of plants is included. An illustrated description of the Joliet coke oven plant appeared in *The Iron Age*, December 12, 1907.

Tool Holders.—O. K. Tool Holder Company, Shelton, Conn. Catalogue No. 4. Concerned with a system of lathes, planer, shaper and boring mill tool holders and tools which is claimed to offer all the advantages of a solid forged cutting tool combined with the most economical use of steel. The various sets of tools are illustrated and described and there is also a brief description of the testing outfit which this company maintains for the purpose of comparing the merits of the different types of tools now on the market. An illustrated description of this testing plant and some of the tests made in it appeared in *The Iron Age*, February 23, 1911.

Rope Couplings.—C. W. Hunt Company, 45 Broadway, New York City. Pamphlet No. 11-7. Contains illustrations and a brief description of the use of a tension adjusting coupling for transmission rope. It is designed for use with the multiple system of rope driving and enables the stretch of the rope to be controlled at all times and an even tension maintained.

Cutting-Off Machines.—Espen-Lucas Machine Works, Philadelphia, Pa. Catalogue E. Lists a line of cutting-off machines for cold sawing bars, structural shapes and rails and for general shop purposes. Each machine is given a separate page with an engraving at the top and a brief text description underneath. Mention is also made of hand and automatic saw sharpening machines for sharpening the saws used in the other machines described in the catalogue.

Drop Forgings.—Indianapolis Drop Forging Company, Indianapolis, Ind. Lists a line of drop forgings which includes all types of wrenches, combination pliers, ammonia flanges, automobile forgings, connecting rods, chisels, punches, etc. All of these are illustrated with a brief list of the various sizes in which they can be furnished and in addition several pages are given over to illustrations of the different kinds of special forgings which can be supplied to order.

Manganese Steel Gears and Conveyor Parts.—Taylor Iron & Steel Company, High Bridge, N. J. Two bulletins. No. 100-B points out the advantages of using the Tisco manganese steel gears and pinions which can be supplied in either the spur, bevel or miter types. Halftone engravings showing the several styles of gears and pinions which can be furnished are included as well as tables giving the various sizes of the different gears which can be supplied. No. 113 gives general description and specifications for a line of manganese steel chains, sprockets and spiral conveyors. Complete tables of the various sizes of sprockets which can be furnished are given together with illustrations of the different chains. An illustrated description of two of these chains appeared in *The Iron Age*, October 19, 1911.

Vacuum Pumps.—Goulds Mfg. Company, Seneca Falls, N. Y. Bulletin No. 106. Devoted to a line of vacuum and stuff pumps. The vacuum pumps are of the doubling-acting piston type and are built in a number of sizes ranging in capacity from 170 to 2700 gal. per minute. These pumps are designed for the suction box on paper machines, vacuum pans, surface condensers and the vacuum system of steam heating and a special feature of their construction is that the valves at both heads of the cylinder are always submerged and the usual priming is unnecessary. The stuff pumps which are designed to withstand severe service in paper mills for pumping wood pulp and stuff and size in textile mills are of the single-acting triplex plunger type and have a capacity of 3 to 56 tons of dry paper per day.

Iron Sheets.—Newport Rolling Mill Company, Newport, Ky. Pamphlet. Calls attention to the genuine open-hearth iron sheets of this company which are rust-resisting and can be employed for sheet metal work of all kinds. A list of the various types of sheet made completes the booklet.

Concrete Piles.—MacArthur Concrete Pile & Foundation Company, 11 Pine street, New York City. Pamphlet entitled "Some Structures Supported by Pedestal Piles." Illustrates and describes some of the recent work done with Pedestal pile foundations. The structures include freight houses, a large gas tank, a reinforced concrete retaining wall, a viaduct and several apartment houses and factory buildings. In connection with each structure a brief statement is given of the character of the soil and other difficulties encountered in placing the foundation.

The Machinery Markets

Conditions in the machinery trade throughout the country when averaged indicate a fair amount of activity with betterment here and there. There has been an increased number of sales in the New York market but none of any unusual size. Within the week there was a fair volume of inquiries in the Philadelphia market with a proportionate number of actual sales, although the latter came slowly. In New England a slight falling off was noted, more so with dealers than manufacturers, partly as a result of the observance of a local holiday. Buyers of machine tools are reported busy in New England. New manufacturing plants forecast good business opportunities in Cleveland although the machinery trade has been rather light in the last week. An increase in both sales and inquiries has existed in Cincinnati to which the railroads are said to have contributed. The export trade has been good. The Detroit market has also improved and conditions are stimulated by the large number of new incorporations. The South, despite the disastrous floods, is holding up well and most industrial plants are operating on full time. A good demand exists in Texas, particularly for drainage and irrigation equipment. St. Louis has been rather quiet, though the run of small buying has been steady. Trade has improved on the Pacific coast where the Southern Pacific Railroad has an inquiry out for tools for its Oakland shop, bids for which are to be opened in July. The increased use of power pumping plants, traction engines and other development equipment, is creating a demand for repair facilities in the far West.

New York

NEW YORK, April 24, 1912.

Local conditions in the machinery trade have shown a tendency toward improvement in the last week. At the same time, while the volume of trade has undoubtedly increased, the betterment cannot be called great and has consisted of an increased number of sales instead of any transactions of unusual size. Sellers of outdoor equipment used by contractors in construction work are busy and from all indications will have no cause to complain of their spring season. It is not expected that orders will be placed this month against the list of the Safety Car Heating & Lighting Company for its plant extension in Jersey City, N. J. A good part of the business of the Delaware & Hudson Company for its Watervliet shops has been closed, while a portion still remains under consideration. Managers and salesmen in heavy equipment lines say that the wreck of the steamship Titanic had a detrimental effect on business for a day or two, partly because so many of their customers had suffered the loss of friends and acquaintances and also for the reason that people were inclined to talk of little else but the catastrophe.

B. Morgan, manufacturer of automobile specialties, Tew's Court, Old Beach road, Newport, R. I., is in the market for an automatic screw slotting machine suitable for slotting machine screws and wants to get in touch with makers of such machines.

B. F. Avery & Sons, Louisville, Ky., are inquiring in the New York market for firms which can quote on steel dies for drop hammer work, the hammer weighing about 600 lb.

The Auburn Thread & Twine Company, Auburn, N. Y., recently incorporated with $36,000 capital stock, is having plans prepared for a factory building, 50 x 175 ft., one story, to be equipped with machinery for the manufacture of flax twine, the machines to be of the group system, electrically driven. The officers of the company are H. L. Ferris, president; William Acheson, vice-president; C. H. Steel, treasurer, and J. Taber, secretary.

The Newark Varnish Works, Delancy street, Newark, N. J., has had plans prepared for an addition to its plant, 30 x 99 ft., two stories, of brick construction. The building will be used for offices and tank storage.

The Superior Ivory Button Company, Newark, N. J., has had plans prepared for a manufacturing plant consisting of a main building, 50 x 150 ft., four stories, with an L, 42 x 63 ft., one story. The estimated cost of the building, with its equipment, is $50,000. Details as to the nature of the machinery required are not as yet available.

The Borough Council of Longport, N. J., will receive bids until May 9 for the construction of a sewer system to cost approximately $10,000.

The Water Commissioners of White Plains, N. Y., will receive bids until April 29 for alterations to the Orchard street pumping station; also for furnishing a filtration plant of 1,000,000 gal. daily capacity.

The Delac Wall Board Company, Caledonia, N. Y., will build a factory on a site just purchased at the junction of the Buffalo, Rochester & Pittsburgh and the Lehigh Valley railroads in that town.

McEwen Bros., Wellsville, N. Y., manufacturers of gas engines and oil-well supplies, will build a factory at Tulsa, Okla., to manufacture gas engines and accessories. The new plant will cost about $75,000.

The Crescent Bread Company, Utica, N. Y., has let the contract for the erection of a bakery plant 63 x 99 ft., three stories and basement.

The United States Light & Heating Company, Niagara Falls, N. Y., has acquired the interest of F. F. Edeland in an electric apparatus for motor starting and will equip a plant for the manufacture of the device which will employ about 200 men.

The Auto-Aero Pump Company, Buffalo, N. Y., has been incorporated by Walter W. and Michael M. Cohn and Louis K. Schwartz for the manufacture of pumps for use in automobiles and aeroplanes. The company has temporary offices in the Mutual Life Building with Michael M. Cohn.

The Common Council of the city of Buffalo has authorized the issue of bonds for $200,000 to purchase a site of 80 acres for a City Hospital, at Kensington avenue and Girder street, and the preparation of plans for hospital buildings to cost $650,000, including a power house with heating and electric lighting plant equipment, and a laundry building with equipment. Francis G. Ward, Municipal Building, is Commissioner of Public Works.

The Buffalo Weaving & Belting Company, Buffalo, has commenced construction of an addition to be made to its plant at Chandler street and the New York Central Railroad belt line. The new building will be 50 x 150 ft. and one story, of brick and steel construction, with steel truss lantern roof. It will be equipped with rubber making and impregnating machinery.

The Farnham Mfg. Company, Buffalo, manufacturers of paper-mill machinery, conveyors, elevators, transmission machinery and special eye-beam trolleys for overhead conveying systems, has completed arrangements for moving its plant from 83 Washington street to Indiana and Mary streets. Some additional machinery will be required.

The United Aviation Company, Buffalo, has been incorporated with a capital stock of $300,000, to manufacture aeronautical machines. H. J. Carrigan, I. R. Ferguson and M. Winkler are the incorporators. Plans for a manufacturing plant are under consideration.

The Sodus Gas & Electric Light Company, G. R. Mills, general manager, Sodus, N. Y., is arranging for the construction of an electric-light plant at Cohocton, N. Y.

The Rome Wire Works, Rome, N. Y., has had plans completed for an addition 125 x 133 ft. and one story of structural steel and brick, to be made to its manufacturing plant. H. T. Dyett is president of the company.

The Village Board, Wolcott, N. Y., is having plans prepared for a water works system, including a pump house and two power pumps, and a stand pipe 15 x 85 ft.

The Orchard Machinery Mfg. Company, Gasport, N. Y., manufacturer of spraying outfits and light tractors for farm and orchard work, has purchased the plant and machinery of the Gasport Motor Company of that place, which it will utilize. No additional machinery will be required for the present.

The Remington Arms Company is adding a tool house 40 x 168 ft. and two stories, to its plant at Ilion, N. Y.

King Bros., Oswego, N. Y., have secured the contract for furnishing and installing motors and electrical machinery on the Erie Canal locks, between Oswego and Baldwinsville.

The Oneida Community, manufacturers of silver-plated ware, etc., P. B. Noyes, president, is having plans prepared for a factory building 75 x 100 ft., three-story and basement, which it will build at Sherrill, N. Y.

The town of New Hartford, Oneida county, N. Y., will construct a sewage disposal plant and sewerage system. Bids are being received by the Sewer Commissioners of Town Sewer District No. 1. C. L. Marshall, chairman.

The Geneva Preserving Company, Geneva, N. Y., has given a contract to the Dollard Construction Company, Syracuse, N. Y., for the construction of a three-story and basement canning factory, to replace a building recently destroyed by fire.

The Smith-Kinney Company, Binghamton, N. Y., has secured a site on Lewis street, on which it will build an addition to its plant of brick construction.

Alderman Fairchild & Co., 29 Elizabeth street, Rochester, N. Y., have let a contract for the erection of a paper box factory on Orchard street, 62 x 254 ft. and four-stories, to cost $50,000.

Business Changes.

The Prentiss Tool & Supply Company, Singer Building, will close its New York warehouse at 115 Liberty street on or about May 1 and concentrate all its stock at its Jersey City warehouse, 447 Communipaw avenue.

The Vandyck-Churchill Company has taken possession of its new warehouse, Hudson and Morris streets, Jersey City, N. J., and closed its showroom at 85 Liberty street, New York. The offices of the company remain as heretofore at 529 Singer Building, Liberty street. The new warehouse is but 12 minutes from the New York office of the company, via the Hudson tubes, and but three minutes from the Exchange place station of the Pennsylvania Railroad and the Hudson tubes.

New England

BOSTON, MASS., April 23, 1912.

A slight reaction is apparent in the market for machine tools, the demand having fallen off slightly in the past fortnight. However, this condition seems to apply more to dealers than to manufacturers, and it is doubtful if the average of orders, taking the situation as a whole, has changed for the worse. The buyers of machine tools are busier than they have been, many of them much busier. Patriots' Day, April 19, coming on a Friday, practically stopped business for the week end. The great ocean disaster has had a certain influence in distracting attention from business. The tool steel trade is extremely active, orders being much more numerous than for months past. They are from a more widely diversified trade, and more of them are for larger lots. This is particularly true with the high grade steels, including foreign products.

The American Tube Works, Boston, has moved its city office from 95 Broad street to 10 Oliver street, the large store recently occupied by the Machinery Exchange, which has gone out of existence. The new quarters include a large stockroom on the same floor.

J. C. Horne has established the Union Gear & Machine Company at 85 Purchase street, Boston, to manufacture gears and other machine shop products.

The Critchley Machine Screw Company, Worcester, Mass., manufacturer of screw machine products, has purchased the business of the H. E. Chellis Company, Springfield, Mass., and will transfer the equipment to the new factory at South Worcester. The Critchley Company has recently purchased the National Acme machines of the Hamden Machine Screw Company, Springfield, and five large size motor-driven National Acme machines of the McCue Company, Hartford, Conn. Another absorption is that of the screw machine department of the J. L. Parker Company, Worcester.

The Coppus Engineering & Equipment Company, Union and Schools streets, Worcester, Mass., has been incorporated in Massachusetts and will manufacture and place on the market a new turbo-blower, the invention of Frans H. C. Coppus of that city. Mr. Coppus is the president and treasurer; Fritz W. Schmidt, vice-president, and Linwood M. Erskine the third director. The company has a capital stock of $50,000. It states that tests of its blower proves it most efficient in increasing the capacity of boilers and chimney drafts.

Palmer Bros., Fitchville, Conn., will erect an addition to their plant 90x175 ft., three stories.

The Wilcox & White Company, Meriden, Conn., will build a large addition to its plant.

The new plant of the American Thermos Bottle Company, Norwich, Conn., will consist of a building 100x200 ft., two stories and basement. Electric power will be used.

The property of the Hardware & Woodenware Mfg. Company, was sold at Worcester, Mass., April 20 to A. A. Tisdale, Leominister, Mass., for $440,000. It was given out after the sale that Mr. Tisdale represented managers of the branch plants of the company, who proposed to operate them as separate companies. The names given are Frank L. Hunt, Brattleboro, Vt.; H. T. Kingsbury, Keene, N. H.; W. C. Burdett and C. A. Greene, Leominister, Mass.; C. B. Frisbie, Cromwell, Conn.; N. L. Hill and John L. Watrous, East Hampton, Conn.; L. S. Bixler, Canton, Ohio; C. A. Jones, Freemansburg, Pa.; O. R. Noble, Granville; C. E. Higgins, New York; and C. E. Cockran, Boston. The company owns plants in various parts of the country.

The Waterbury Buckle Company, Waterbury, Conn., will erect a factory building of brick, mill construction, 58x123 ft, three stories and basement.

The Branford Foundry Company, Inc., has been organized as a Connecticut corporation with Walter Y. Schall, president; S. V. Osborne, vice-president, and John J. V. Cunningham, secretary and treasurer. The company leased a foundry fully equipped and began operation early in the year.

The Pope Mfg. Company, Hartford, Conn., will erect a factory building 72 x 192 ft., four stories and basement. It has decided to add a line of lower priced cars to its present list of automobile models, and additional manufacturing capacity is necessary for the purpose. An exhaust system will remove gasoline fumes from the basement, and two exceptionally large elevators will be installed.

The Belknap Mfg. Company, Bridgeport, Conn., will erect a foundry 48x131 ft., one story, of brick and steel.

Philadelphia

PHILADELPHIA, PA., April 23, 1912.

While there is a very fair volume of inquiry, the number of orders actually placed has not shown any material increase. Some little improvement is shown in spots, but business generally continues to drag. Some machine tool merchants report a slightly better demand, but buying is scattered and still far below what might be expected from the volume of inquiry. Considerable business in small as well as general shop equipment is under negotiation, and a fair amount is in sight. Extensions to manufacturing plants, as well as the erection of new plants, are more noticeable and several moderate purchases of machine tool equipment are looked forward to. Considerable business in power plant equipment for such new projects is being figured on. Industrial conditions generally, as far as users of metal working machinery and tools are concerned, are steadily improving. Iron and steel mills continue to operate on a better basis. Shipyards and locomotive plants are gaining in point of activity.

The railroad demand continues extremely light, particularly in this district. Business from some of the Southern railroads is, however, expected in the near future.

Boiler and engine builders are reported more actively engaged. A fair amount of new business in power equipment of the smaller capacities, both new and second-hand, is reported. Second-hand machinery and tools are in slightly better inquiry, although business generally is still of a rather unsatisfactory nature.

Here and there some improvement in the demand for both iron and steel castings is noted, but the productive rate, while better in spots, has not yet shown any marked general betterment.

Emory & Eisenbrey, engineers, have plans prepared for a new plant for the North American Chemical Company, at Urbana, Ohio. The building is to be 32 x 117 ft. and two stories, with boiler and engine room and shipping room in separate buildings. Plans will be ready for estimate on the building construction this week and will be asked on both reinforced concrete and brick construction. Bids are now being taken by the engineers for a 100-hp. slide valve engine, two 125-hp. boilers, pulverizers, conveying machinery and other necessary equipment.

It is stated that contracts have been placed with builders in Bridgeton, N. J., for the erection of one of the largest canning plants in that section. The new plant will be used as a general packing factory for fruits and vegetables. Walter Baker, Bridgeton, N. J., is understood to have charge of the enterprise, although definite information is not available.

The American Tin & Terne Plate Company has acquired mill properties at the Southwest and Southeast corners of Twenty-fourth and Vine streets, to which it will move its present business as soon as necessary alterations can be made. This concern is engaged in the tin and terne plate and plumbing supply business and its present plant is too small for its growing requirements. The property acquired will give it ten times as much floor space as it now has. No machinery will be required in the equipment of the new plant, although the company states that later on it may engage in the manufacture of various plumbing supplies.

The York Band Saw Works, York, Pa., is building a reinforced concrete factory building, 30 x 60 ft., one story with concrete roof, on South Newberry street near College avenue. The new plant is expected to be completed in the next 30 days, and the present requirements of the company in the way of machinery have been covered.

J. Edwards & Co., shoe manufacturers, have acquired property at Twelfth and Wood streets, 71 x 124 ft., on which they will erect as soon as plans can be completed, a 10-story reinforced concrete building, which will be used for their own business as well as general manufacturing purposes. They will be in the market at an early date for the necessary equipment for power and heating purposes, elevators and the usual factory building equipment.

Announcement is made that the corporation known as Francis Brothers & Jellett, of Philadelphia and New York, designing and contracting engineers for steam, plumbing, electrical, mechanical and sprinkler installations, is in course of dissolution. The corporation is being succeeded in Philadelphia by Stewart A. Jellett, who has opened an office in the Franklin Bank Building. In New York the company's interests have been taken over by W. L. Fleisher & Co., who will continue the business at 156 Fifth avenue. W. L. Fleisher has for many years been the New York manager for Francis Brothers & Jellett. All the contracts undertaken by the old corporation will be completed before the final dissolution.

The Hellwig Silk Dyeing Company has purchased a tract of ground on Homestead street, Tacony, with a frontage of 950 ft. on the Delaware River. The company advises the property has been purchased with the view of extensions in the future and while a large plant may ultimately be built on the site, the matter has been given no consideration and will not be taken up for some time.

Peuckert & Wunder, engineers, have plans in progress for a factory addition and boiler house for Kind & Landesmann, Fifth street and Pennsylvania Railroad, Camden, N. J. The buildings are to be of brick, two stories, 73 x 93 ft. and 40 x 50 ft., respectively. Additions to the company's power equipment will be required, but its needs have not yet been decided upon.

It is reported that P. F. Flanigan & Sons, Baltimore, Md., will erect an asphalt mixing plant on Hartford Road, in that city. It is understood that the plant will have a capacity for turning out 3,000 sq. yd. of mixed asphalt per day. Details in reference to the construction or equipment are not available.

The J. F. Lewis & Brothers Company is taking bids for the erection of a pig lead melting and casting house and a storage building to be erected at the company's plant at Huntingdon street and Aramingo avenue. Contracts for the building are expected to be let at an early date. The company will also be in the market for the necessary equipment for the melting and casting of pig lead.

S. L. Allen & Co. are taking bids, from plans by Ballinger & Perrott, for a six-story, brick and concrete factory addition, 75 x 155 ft., with a wing 27 x 59 ft., to be erected at Fifth street and Glenwood avenue. This building will be used for general manufacturing purposes, as well as for storage rooms for unfinished parts. The upper floor will be used for office and drawing room purposes, permitting the expansion of manufacturing facilities in other departments. The new building will be served by the present power plant and it is stated that at the present time no new machinery will be required.

The Wm. Steele & Sons Company has begun operations on a power house, 86 x 75 ft. one story, and a warehouse, 273 x 148 ft., one story, for John Wanamaker, Twenty-first to Twenty-second street on Washington avenue. The necessary equipment for the power house is to be purchased by the Wanamaker engineers.

Mantel Fielding, architect, has been receiving estimates for the construction of a brick and stone power house and laundry for the Presbyterian Home for Widows and Single Women, at Fifty-eighth street and Greenway avenue. It is understood that the necessary power equipment will be purchased by representatives of the home.

The Lafayette Motor Car Company, Easton, Pa., recently incorporated to manufacture auto trucks, has a factory building 110 x 125 ft. of concrete and steel in course of construction.

Cleveland

CLEVELAND, OHIO, April 23, 1912.

Business with the local machine tool dealers the past week has been rather light. One local machinery house took an order from a northern Ohio manufacturer for four lathes and three other machine tools, aggregating about $8,000. Aside from this order, business was practically all in single tools, the demand for which is not brisk. No inquiries of any size have come out recently. Orders are mostly for small tools, a large share of them coming from new concerns that are starting in business in a small way. The demand for second-hand machinery is fairly active, but there is a large amount of used machinery in dealers' hands. Quite a large amount of work is in prospect this season in the line of new manufacturing plants and additions in metal working lines, but it will be some time before machinery is required for these extensions.

Some makers of handling machinery report the demand as less active than in March, but plants in these lines are quite well filled with orders.

The Canton Metal Ceiling Company, Canton, Ohio, has been incorporated with a capital stock of $200,000 by C. A. Weirich, L. V. Carnaham and others to manufacture ceilings, roofings and siding. The company has purchased a four-acre site on South Harrison avenue near the plant of the Canton Sheet Steel Company, on which a plant consisting of several fireproof buildings will be erected at once.

The Croxton Motor Company, Cleveland, Ohio, has closed a deal with the Washington, Pa., Board of Trade for the removal of its plant to that city. A six-acre site will be provided. The company is planning the erection of a factory building 120 x 500 ft., of brick and steel construction. The building will be one-story with the exception of one section, which will be made two stories to provide room on the upper floor for offices. It is expected that considerable new machinery equipment will be purchased.

The city of Cleveland will receive bids shortly for four electrically driven pumps for high pressure fire service. They will be of the horizontal multi-stage centrifugal type, with a capacity for discharging 2500 gal. per min. each, against a pressure on the discharge end of 270 lb. per square in. They will be direct connected to three-phase alternating current induction slip ring motors operated at 1150 rev. per min. Bids will also be received for controllers, transformers, switches, motor starters, etc.

The Jansen-Peterson Company, Cleveland, Ohio, a new concern, has established a plant at 1688 Columbus road for the manufacture of wood-working machinery, making a specialty of belt sanding machinery. The company has a capital stock of $100,000. Its officers are as follows: W. C. Bruce, president and treasurer; E. N. Jansen, vice-president and general manager; J. F. Peterson, secretary and sales manager.

Plans for a water-works system for the Provident Coal Company, St. Clairsville, Ohio, are being prepared by the J. W. Fraizer Company, engineers, Rockefeller Building, Cleveland, Ohio, which will shortly place orders for piping, a filtration plant and pumps with a capacity of about 100,000 gal.

The Henkel Company, Fremont, Ohio, will enlarge its plant by the addition of a two-story and basement brick building 50 x 150 ft. The extension was made necessary by the growth of the company's business. Its products include razors, safety razors, shears, manicure implements, etc.

The West Steel Casting Company, Cleveland, Ohio, will enlarge its plant by the erection of a new foundry building, 52 x 70 ft. An additional converter will be installed and a 10-ton crane. The crane will be furnished by the Cleveland Crane & Engineering Company.

The American Dynalite Company, Amherst, Ohio, maker of explosives, will enlarge its plant by the erection of several new buildings.

The Safety Fire & Gas Appliances Company, Cleveland, has been incorporated with a capital stock of $15,000 by O. P. McIllrath and others. The company plans to establish a manufacturing plant.

The Union Steam Pump Company, Battle Creek, Mich., will enlarge its plant by the erection of a

foundry building, 40 x 236 ft., of brick and steel construction, and a reinforced concrete building, 40 x 120 ft., for pattern storage.

The Cleveland Motor Truck Mfg. Company has taken over the plant of the Howard Motor Car Company, Galion, Ohio, and will remove its Cleveland plant to Galion. The company manufactures electric motor trucks. Its offices will remain in the New England Building, Cleveland.

The Cummings Canning Company, Conneaut, Ohio, will enlarge its plant by the erection of an addition, 60 x 130 ft.

Plans for the new building to be erected by the Berger Mfg. Company, Canton, Ohio, have been prepared by the Osborn Engineering Company, Cleveland, Ohio. The building will be 80 x 380 ft., four stories. It will be of brick and steel construction.

The Robinson Mfg. Company, 1911 Harvard avenue, Cleveland, Ohio, will shortly begin the erection of a one-story factory building, 30 x 60 ft., for the manufacture of pipe straps and pipe hangers.

The Gearless Gas Engine Company will move from Springfield to Washington C. H., Ohio, where it has commenced the erection of a new plant for the manufacture of gearless gas engines and a ventilator grate. The new plant will be 40 x 80 ft., one story. George B. Swope is at the head of the company.

The Winchester D. Handle Company will move from Attica to Bellevue, Ohio, and will erect a two-story manufacturing plant, 98 x 42 ft.

The City Council of Bryan, Ohio, has authorized a bond issue of $5,000 for additional power equipment for the water works and electric lighting plants.

Engineer William G. Clark of Toledo has recommended a new filtration plant for Sandusky, Ohio, to cost $100,000. It is stated that the work will commence as soon as plans are completed and the contract can be let.

The Ventwell Store Front Company is the name of a new concern that has established a plant at 118 Noble court, Cleveland, Ohio, for the manufacture of drawn copper and drawn steel moldings for store fronts. W. R. Phillips is the manager.

The Lewis File Company, Beach City, Ohio, which was recently organized, is equipping a plant for the manufacture of machine and hand cut files.

The New Idea Seed Cleaner Company, Shiloh, Ohio, is a new concern which is fitting up a manufacturing plant and buying machinery.

The Reeves Mfg. Company, Canal Dover, Ohio, has commenced the erection of a new building, 130 x 420 ft., which will be used as a corrugating plant.

The Canton Machinery Exchange, 624 North Market street, Canton, Ohio, has been formed to deal in machine tool specialties and desires catalogues and literature from manufacturers.

Chicago

CHICAGO, ILL., April 23, 1912.

The Firestone Steel Foundry Company, Chicago, has been organized with an authorized capital stock of $10,000 to manufacture metal articles. The incorporators are Roger L. Foote, A. A. Firestone and M. M. Choate.

The Chrome Silver Bronze Company, Chicago, has been organized with a capital stock of $10,000 by Harvey J. Hay, John T. Fitzgerald and E. C. Koskoba. The company will manufacture and deal in metals, alloys and amalgamations.

The J. L. Morrison Company of Illinois, Chicago, has been incorporated with a capital stock of $2,500 to manufacture and sell wire and stitching machinery. Incorporators are Thomas A. Gibson, Joseph L. McNab and Alexander Dushoff.

The Carl Boensch Mfg. Company, Chicago, has been incorporated with a capital stock of $25,000 by Carl Boensch, Walter J. Jensen and Frieda Getz. The company will manufacture and deal in electrical fixtures.

The Cutshall & Flagg Company, manufacturer of paving brick, will build a new plant near Mount Carmel, Ill., to take care of its increased business. The cost of the building is estimated at $150,000. New machinery will be installed.

C. F. Ringer & Son are completing plans for a factory, 124 x 130 ft., for the Milwaukee Lithographing Company, Milwaukee, Wis., at Twenty-second and Sycamore streets. Construction will be of concrete.

The Federal Rubber Mfg. Company, Cudahy, Wis., will expend $50,000 in the erection of new additions to its plant.

The plant and two warehouses of the Burlington Blanket Company, Burlington, Wis., were destroyed by fire last week with a loss of $100,000. It has not been decided whether the company will rebuild.

The city of Paulina, Iowa, has issued bonds to the amount of $8,000 for the improvement of its water plant and electric light system.

The Minneapolis Artificial Ice Company, Minneapolis, Minn., recently incorporated with $250,000 capital stock, has purchased a site on Lyndale avenue of that city for the erection of its new factory. The building will be of brick, 70 x 200 ft., one story.

The A. E. Shorthill Company, Cedar Rapids, Iowa, is contemplating the erection of a new factory at an approximate cost of $250,000.

The city of Mount Pleasant, Iowa, is to have a new electric light and power plant, the cost of which is estimated at $20,000.

Woodriver, Ill., has completed plans for the expenditure of about $55,000 for water-works and sewage pumping systems.

The Farmers' Elevator Company, Standard, Ill., has been incorporated with $50,000 capital stock by Fred A. Mudge, Theodore Nauman and Edward J. Olsen, to construct and equip a grain elevator.

The Vanguard Mfg. Company, Joliet, Ill., has incased its capital stock from $25,000 to $50,000 to enlarge its plant.

The McGavin Specialties Company, Springfield, Ill., has been organized with $12,000 capital stock to equip a plant for the manufacture of specialties. The incorporators are H. Clay Wilson, Allan D. Millard and James McGavin.

The Chicago Coal Company, Chicago, Ill., has acquired 83,000 acres of coal land in the vicinity of Mount Vernon, Ill., which it will develop and equip with proper machinery as rapidly as practicable.

The Vienna Gas Company, Vienna, Ill., has been incorporated by C. W. Mills, Harry Eller and George E. Galeener to establish a public service gas plant.

Cincinnati

CINCINNATI, OHIO, April 23, 1912.

The majority of manufacturers in this territory report an increase in both orders and inquiries. This applies especially to the machine tool trade. Domestic orders are coming in at a fairly satisfactory rate, and no particular section of the country appears to be furnishing more than its usual percentage of business, which is an indication that the same general conditions exist elsewhere. The export trade has also shown up well lately, but as this particular business comes in spurts, it cannot be judged from one week's showing. It is known that a number of the larger railroad companies have been quiet purchasers of machine tools, in small lots, and this has materially aided several manufacturers who depend on that particular trade for most of their patronage.

A careful canvass of foundries in this section shows an average of about 10 per cent. more iron being melted than during the previous three months.

The Regal Belting Company, Cincinnati, has acquired a site on Spring Grove avenue, on which will be erected a brick, steel and concrete building 50 x 120 ft., with saw-tooth roof. The company's plant is at present on Linn street, which will be moved to the new location as soon as possible. Considerable extra equipment will have to be purchased, including motors and power transmission machinery.

The Big Four Railroad Company has not yet purchased the machine tools for which it put out a list last month. Formal requisitions are being held up, and the order is not expected to be placed until sometime next month. About 22 tools are included in the list.

The M. Marcus Building Company, Cincinnati, has contract for erecting the factory building of the Herschede Hall Clock Company, recently mentioned.

The Cincinnati Precision Lathe Company, Fosdick Building, Cincinnati, has in full operation its new plant at Mt. Washington, an addition to which is contemplated to be made in the near future.

The Findlay Red Brick Company, Findlay, Ohio, has been incorporated, with $30,000 capital stock, by P. W. Ewing, E. C. Edwards and others. The new company's machinery requirements are not yet known.

The Wood Ice Company, Cincinnati, is planning an addition to its plant in Norwood suburb.

William Hillenbrand, Cincinnati, will probably erect a large garage at the corner of Race and Court streets, in which will be installed a repair shop. It is rumored

that this building will be erected for the Cincinnati Automobile Company.

Considerable structural material will be required for a 10-story brick and steel building to be erected for the Glendale Distilling Company, Lawrenceburg, Ind.

The Stacey Mfg. Company, Cincinnati, has let contract for a one-story foundry addition, 50 x 200 ft. The new building will be of brick and steel construction.

The M. Marcus Building Company, Cincinnati, will erect the addition to the plant of the Lodge & Shipley Machine Tool Company, recently mentioned.

B. L. Baldwin & Co., Perin Building, Cincinnati, have completed plans for the immense soap factory to be erected for the M. Werk Soap Company, Cincinnati, in St. Bernard suburb.

The Cincinnati Business Men's Club has decided to issue a monthly publication that will be entitled "The Optimist," which will be devoted to industrial, financial and other business interests. J. M. Manley, former civic secretary of the club, who resigned to go with the Hisey-Wolf Machine Company, originated the idea, and will edit its first edition.

The Cincinnati Lithographing Company, Cincinnati, will soon be able to move into its new plant on Flint street. It is in the market for electric motors and power transmission equipment.

The New York Coat & Apron Company, Cincinnati, whose laundry was recently destroyed by fire, will move to 1312 Race street, and will need special laundry machinery, in addition to a number of electric motors.

The Mosler Safe Company, Hamilton, Ohio, is considering making an extensive addition to its plant, for which considerable metal working equipment will be required.

Indianapolis

INDIANAPOLIS, IND., April 23, 1912.

The Associated Manufacturers Company, Indianapolis, has been incorporated with $10,000 capital stock, to manufacture machinery. The directors are: J. C. Finch, B. Finch and H. B. Plumb.

The Vixen Motor Company, Indianapolis, has been incorporated with $12,000 capital stock, to manufacture motors and auto parts. The directors are F. C. Schmid, W. J. Harris, C. O. Van Horn, S. B. Lindley and D. K. Lindley.

The Roby Carburetor Company, Indianapolis, has been incorporated with $10,000 capital stock, to manufacture auto parts. The directors are F. S. Roby, C. J. Schuh and E. D. Salsbury.

The Keller Laboratory & Supply Company, Indianapolis, has been incorporated to manufacture dental supplies. The directors are Ellis E. and M. Keller and John H. Fisher.

The Central Steam Heating Company, Anderson, Ind., has let the contract to the American District Steam Company, Tonawanda, N. Y., to rebuild the steam heating system.

The Indiana Electric Appliance Company, Ft. Wayne, Ind., has been incorporated with $25,000 capital stock, to manufacture electrical apparatus. The directors are W. L. Moellering, C. E. Prange, Arthur Lepper, Henry Klebe and C. F. Prange.

The foundations for the new shop buildings of the Lake Shore Railroad, at Elkhart, Ind., are being put in. The shops and equipment will cost approximately $3,000,000, according to the engineers' estimates.

The Auburn Handle Company, Auburn, Ind., has been incorporated with $12,000 capital stock, to manufacture handles. The directors are R. V. Vaughn, C. D. Buck and C. Buck.

The Traction Appliance Company, Vincennes, Ind., has been incorporated with $35,000 capital stock, to manufacture electric and gasoline motors. The directors are F. C. Morgan, G. E. Henry and J. J. Risch.

The Mahoney Railroad Switching Machine Company, Vincennes, Ind., has increased its capital stock from $20,000 to $100,000.

B. W. Bennett & Co., Muncie, Ind., have been incorporated with $10,000 capital stock, to manufacture brick and clay products. The directors are B. W. Bennett, P. K. Morrison and A. D. Paden.

The Warner Vacuum Cleaner Company, Muncie, Ind., has been incorporated with $10,000 capital stock, to manufacture vacuum cleaners. The directors are J. F. and Henry Warner, J. F. Kiser and Ralph Ault.

The Ross Gear & Tool Company has selected a site on North Eighth street, La Fayette, Ind., for the erection of its new factory, which, when completed will contain 50,000 sq. ft. of floor space. The company manufacture steering gears for use on motor trucks.

The Danville Canning Company, Danville, Ind., has been incorporated with $50,000 capital, for the construction and equipment of a canning factory. The stockholders are J. W. Trotter, W. S. Christy and C. B. Newland.

Power and milling equipment will be needed by the Crescent Flour Mills, Crothersville, Ind., recently incorporated with $15,000 capital stock by E. P. Rider, president, and H. R. Rider, secretary and treasurer.

The Central Indiana Steam Heating Company, Anderson, Ind., is in the market for equipment for its new plant, consisting of two 1600 hp. boilers, two boiler feed pumps and a feed water heater for 1600 to 2000 hp.

Detroit

DETROIT, MICH., April 23, 1912.

A somewhat better volume of business is being transacted at present, although the buying is largely confined to small lots. Numerous recently organized concerns continue to come into the market for equipment, which tends to keep up the demand for general factory and shop supplies. A number of fair inquiries are under negotiation, which, if they mature, will help to swell the totals for the month. The second-hand machine tool market has eased up somewhat. Building circles are extremely busy, with a large amount of factory construction under way.

The Swedish Crucible Steel Company is planning extensive improvements to its plant at Hamtramck, a Detroit suburb. The principal additions will be a new foundry building 80 x 100 ft. and an office building 25 x 30 ft. The company reports a good volume of business and more active conditions are looked forward to.

The Morse-Beauregard Mfg. Company, recently incorporated to manufacture motor-cycles, is negotiating for a manufacturing plant and expects to begin operations soon. William Beauregard is general manager of the new company which has temporary offices in the Majestic Building.

The Allyn Engineering Company, architects and engineers, with headquarters at Cincinnati, has opened a Detroit office with Charles A. Belanger in charge as district engineer.

The Murphy Iron Works, Detroit, has awarded the contract for a one-story brick and steel foundry to be erected on Guoin street near McDougall avenue. The cost of the new structure will be $25,000.

The Houghton Elevator & Machine Company, Detroit, reports a material improvement in inquiries for its products and its elevator department has recently secured contracts for installations in the new buildings of the Hupp Corporation, the Fisher Body Company and the Timken-Detroit Axle Company.

The Anglada Company, Detroit, has been incorporated with a capital stock of $50,000 by Wadsworth Warren, Joseph A. Anglada and Frank W. Fitcher. The company will manufacture demountable automobile rims.

The England Mfg. Company, Detroit, has been incorporated with $50,000 capital stock to manufacture a line of pressed steel doors and other specialties for automobiles. The incorporators are Frederick England, John W. Foster and J. Albert Davis.

The Detroit Edison Company, Detroit, will erect a six-story steel and concrete power house at Jefferson and West End avenues. The new building will cost $125,000 exclusive of equipment. A two-story brick warehouse will also be constructed.

The Coleman Mfg. Company, Detroit, has been organized with $25,000 capital stock to take over the business of J. C. Coleman, manufacturer of automobile steering wheels. No extensions will be made at present.

The Diamond Mfg. Company, Detroit, is adding to its plant facilities by the erection of an additional factory building. The company manufactures a line of copper and brass specialties.

The Armstrong Tanning Company, Detroit, has completed plans for the erection of a four-story concrete addition to its tannery plant on Hart avenue.

The Detroit Electric Appliance Company, Detroit, recently incorporated, has increased its capital stock from $100,000 to $200,000 to provide for future extensions.

Reports emanating from various cities and current in the daily press that the Cadillac Motor Car Company would remove its plant from this city to Cincinnati or Toledo are denied by Wilfred C. Leland, general manager of the company. The present plant of the company is inadequate and the question of enlarging it or

placing a branch in another city is the foundation of the reports.

It is reported that the Stevens Mfg. Company, Rome, N. Y., is negotiating for a factory site in Detroit, preparatory to removing its plant to this city.

The Lenawee Gas & Electric Company, Detroit, whose incorporation was recently announced, has absorbed the Adrian Gas Company, Adrian, Mich., and will enlarge and rehabilitate the plant in addition to laying several miles of new mains.

Baxter, O'Dell and Halpin, architects, Detroit, are drawing plans for a new two-story brick factory to be erected by the C. M. Hall Lamp Company, maker of automobile lamps. The cost of the proposed building is given as $7,000.

It is reported that the recently organized Century Electric Motor Car Company, Detroit, will soon begin the construction of a manufacturing plant. John C. Gillespie is among those interested.

The Invincible Starter Company, Detroit, maker of automobile starting devices, has increased its capital stock from $1,000 to $35,000.

The Jeffrey Dewitt Company, Detroit, manufacturer of spark plugs, will add to its facilities this Spring by the erection of a two-story addition 40 x 100 ft. The new addition will be devoted exclusively to the manufacture of porcelains for spark plugs.

The Wyandotte Foundry Company, Wyandotte, Mich., whose plant was recently burned, has started the work of replacement. The new building will be 100 x 140 ft. and will be constructed of steel and concrete. Equipped, the total cost will approximate $25,000.

Baldwin, Tuthill & Bolton, Grand Rapids, Mich., have awarded the contract for the erection of their new $20,000 machine shop. The new building will be about 125 x 200 ft., one story and will be equipped throughout with modern machinery.

The Grand Rapids & Indiana Railroad has completed plans for the erection of a battery storage house at Cadillac, Mich. Complete equipment will be required.

The Imperial Furniture Company, Grand Rapids, Mich., will erect a new factory on Broadway, to cost approximately $25,000. The new building will be four stories and basement, of brick construction. Some additional woodworking equipment will be installed.

The Bartlett Label Company, Kalamazoo, Mich., manufacturer of gum labels, will erect a new plant and install additional equipment.

Frank H. Milham, Kalamazoo, Mich., has acquired the plant of the defunct Michigan Box Board Company at White Pigeon, Mich. The new owner will place the plant in operation and will consolidate the business with that of the Eddy Paper Company, Three Rivers, Mich.

The South

LOUISVILLE, KY., April 23, 1912.

The general report as to business is that the situation is fair. The demand is holding up pretty well, a good many inquiries for equipment being in evidence. While the amount of business actually being placed is not unusually large, it is sufficient to show that there is a solid foundation for present trade. The outlook is good, and nearly all plants are running full time. Machine tools seem to be in better demand, and electrical equipment is selling well. A feature in this connection is the demand for electrical machinery from the coal-mining districts of eastern Kentucky. Nearly all of the new mines being opened are electrically equipped.

The Louisville Railway Company is completing a large barn at Twenty-ninth street and Broadway. About the middle of the summer work will be begun on the new shops of the company, which will also be located there. The present shops will be dismantled and all operations of that kind concentrated in the new location. Machine tools, wood-working equipment, etc., will be needed.

The New Galt House Company, Louisville, is installing additional equipment, having decided to manufacture its own light and power. Babcock & Wilcox boilers will be put in, and the motors will be furnished by the James Clark, Jr., Electric Company, Louisville. The elevator contract was let to the Otis Elevator Company.

Wood-working interests are reported by the Kentucky Saw Works, Louisville, to be in much better shape, the demand for lumber, staves, handles, spokes, etc., being good and prices higher. This has stimulated the demand for saws.

The Ox Breeches Company, Louisville, has leased an adjoining building and will double its capacity. Additional motors as well as sewing and cutting machines will be required. Charles New is president of the company.

The Interstate Power Company, Louisville, has been incorporated with $500,000 capital stock; J. C. Loomis, T. K. Helm and R. J. Snyder are the incorporators. Plans of the company have not yet been made definitely, except that operations will be in eastern Tennessee. Either water power will be developed or electric current contracted for and distributed to the smaller towns of that section.

The Sutherland Automobile Air Appliance Company, recently incorporated, is equipping a machine shop at 718 South Second street, Louisville, and will manufacture its device as well as repair motor cars. Luke Sutherland is manager of the concern.

The Louisville Commercial Club is endeavoring to interest the Cadillac Motor Company in the establishment of a branch factory in Louisville. Officers of the club state that the company has definitely decided to erect a branch factory.

C. J. Walton & Son, Louisville, have sold a boiler to the Louisville Cereal Mill Company.

Russellville, Ky., is considering the issuing of $30,000 of bonds for the purpose of improving its water system. Besides increasing the capacity of the pumping station, additional pipe will be laid.

The Proctor Coal Company, Williamsburg, Ky., is opening some new mines at Red Ash, near that city, and is buying equipment for its operation. Charles F. Finley, Williamsburg, is president of the company.

D. Y. Johnson, Nashville, Tenn., has leased a site on the Barren River, near Bowling Green, Ky., and is preparing to develop a water-power plant.

The handle and stirrup factory of Henry F. Oliver, Fulton, Ky., was burned April 17, the loss being $25,000. The plant will be rebuilt, but another location may be selected.

The Perry County Coal Company is installing a mining plant in Perry County, Ky., near Viper. Cincinnati capital is interested in the company, I. H. Sharp, W. R. Bradford, E. D. Woodward and others being stockholders.

Anderson & Spilman, Danville, Ky., have let a contract for the erection of an elevator with 25,000 bushels' capacity. Conveying machinery will be needed.

The Kentucky Traction & Terminal Company, Lexington, Ky., is acquiring property for the erection of substations for the operation of its interurban lines. Sites for stations to be used in connection with the Nicholsville and Georgetown lines have been acquired.

The Campbellsville Lumber Company, Campbellsville, Ky., is enlarging the capacity of its flooring plant. Two additional buildings are being erected.

C. F. Rood, Winchester, Ky., will build a box factory in connection with the sawmill which is to be erected there by R. L. Thomas.

James L. Nicholason, Henderson, Ky., has announced that $60,000 will be spent in the construction of a cold-storage plant which has been under consideration for some time. The plant will be operated in connection with the Henderson County Fruit Growers' Association.

The city of Newport, Ky., is to install a 40-ton garbage incinerator.

The Ashland Foundry & Machine Works, Ashland, Ky., has concentrated its efforts on the manufacture of roller coaster equipments, and reports the demand for plants of this kind to be excellent. C. F. Weaver is manager of the company.

Campbellsville, Ky., is considering issuing $25,000 of bonds for the purpose of constructing a water-works plant.

Kirkpatrick & Clay, Mt. Sterling, Ky., will erect a large tobacco warehouse, and will require power equipment and presses for prizing and handling tobacco.

John W. Frye and others, Centreville, Tenn., are planning the construction of a hydroelectric plant near that city. The power, it is said, will be used for the operation of phosphate mines near Centreville.

The Bennings Garage & Machine Shops, Lake Charles, La., has been organized with $25,000 capital stock. S. J. Johnson is president of the concern.

John R. Purser and Sterling Graydon, Charlotte, N. C., plan the erection of a light and power plant, and will also install equipment for a central steam heating plant.

The Emerson Engine Company, Alexandria, Va., has had plans prepared and will soon begin work on a large plant to be erected on the river front near Duke street. The work will be rapidly pushed to completion and the plant is expected to be ready within three months. No equipment details are furnished.

St. Louis

St. Louis, Mo., April 22, 1912.

The conditions in the machine tool trade the past week have been rather quiet, though there has been a good run of business of the individual type. The fact that there are not many new enterprises of importance being floated in the St. Louis territory at the present time is the occasion for the absence of large lists of tools in the market, but there is a steady run of purchases of single tools for extension of capacity or for replacement. Collections continue good.

The Bell Telephone Company of Missouri recently brought under the complete control of the parent company, the American Bell, announces plans for the expenditure this year of about $3,000,000 in improvements, extensions and new equipment. In four other States operated from St. Louis as headquarters about $10,000,000 is to be similarly spent.

The United States Tire Protection Company, St. Louis, manufacturer of tire wear prevention devices, has increased its capital stock from $2,000 to $50,000 for the purpose of extending its manufacturing operations.

The Barry-Wehmiller Machinery Company, St. Louis, has expanded its capital stock from $34,000 to $200,000 and will increase its plant very largely.

The East St. Louis, Columbia & Waterloo Electric Railway has put its construction under way and will build a plant to supply its own power. It will connect East St. Louis, Dupo, Columbia and Waterloo, Ill., with St. Louis.

The National Light & Power Company, St. Louis, has taken over the Interurban Electric system operating between Herrin and Carterville, Ill., and will extend it as well as improve and increase its power plant.

The Austin Mining Company, Joplin, Mo., has been incorporated, with $50,000 capital stock, by W. C. Austin, H. H. Roembke and H. J. Roembke, to equip and operate mineral land owned by them.

Jones Bros. & Co., Louisville, Ky., has completed agreements to erect a food products factory at Springfield, Mo., involving $100,000 of equipment.

The James R. Hogg Distilling Company, Poplar Bluff, Mo., has been incorporated, with a capital stock of $30,000, for the equipment of a distillery at that point. The stockholders are J. R. Hogg, R. M. Elkins and Charles F. Shulz.

Construction has been begun on a plant to cost $200,000, with mechanical equipment, for the Koken Barber Supply Company, St. Louis, manufacturer of chairs, etc., for barbers.

The Cottonwood Fiber Company, St. Louis, has been incorporated with $15,000 capital stock, to equip a plant for the manufacture of fiber products. The stockholders are Lewis Lipman, Williard P. Kaiser and W. F. Schlierholz.

Cluett, Peabody & Co., New York, have been authorized to use $350,000 of their capital stock of $18,000,000 in a branch manufactory in Missouri.

The Utah Light & Railway Company, Salt Lake City, Utah, has begun construction of an addition to its steam plant involving $350,000, and bringing its total hp. to 22,000, double the present capacity.

The Deep Water Well Company, which has had the water franchise for Belleville Ill., has accepted new terms which compel it to put in a plant to pump its supply from the Mississippi River instead of deep wells.

The American Hydro-Blast Company, Springfield, Ill., has taken up plans for the immediate construction and equipment of a plant at East St. Louis for the manufacture of a hydraulic jack to be utilized instead of blasting in bituminous coal mining. The company is headed by E. J. Wallace.

The Electrical Specialty Company, Bartlesville, Okla., has been incorporated with a capital stock of $50,000 by H. V. Foster, R. D. Rood and James P. Anderson. It is anticipated that a new factory will be built for the manufacture of a switchboard recently invented and patented by James P. Anderson, for use in railway systems.

Texas

Austin, Texas, April 20, 1912.

Drainage and irrigation enterprises in various parts of Texas are creating an unusually large demand for machinery for use in constructing the works. Bonds to the amount of more than $2,000,000 have been voted within the last few months for the construction of drainage systems in the gulf coast region and the lower Rio Grande valley of the state. In carrying out these projects the use of considerable dredging machinery is required. There has also been a demand for machinery for ice plants and cotton gins.

The Merchants Ice Company, San Antonio, has purchased a site upon which it will erect a modern ice and cold-storage plant to cost about $250,000. The building will be 148 x 200 x 347 ft. and five stories and a basement. George B. Marshall is vice-president and manager of the company.

The City Council of Orange will let the contract for the construction of a municipal sewer system as soon as the bonds amounting to $25,000, which were recently voted for the purpose, are disposed of.

The El Paso Gas & Electric Company is installing a gas holder at El Paso to cost $35,000. It will have a capacity of 500,000 cu. ft. The company will make other improvements at a cost of $10,000. T. J. Jones is general manager.

E. S. Wood of Austin is preparing to establish a brick manufacturing plant at Kingsville, which will have a daily capacity of 20,000 bricks.

R. J. Kleberg and associates are preparing to construct a dam near Kingsville, for the purpose of creating a water storage reservoir that will have a capacity sufficient to irrigate 35,000 acres of land. The dam will be about one and one-quarter miles long. B. F. Hoyt is preparing the plans for the proposed dam and irrigation works. Besides the storm water, the reservoir will obtain a water supply from artesian wells.

Charles A. Zilker of San Antonio and associates have purchased the property of the Citizens Light & Power Company at Taylor, the consideration being about $50,000. The new owners will consolidate the acquired property with that of the Taylor Ice Company's holdings. It will make enlargements and improvements to the lighting system.

The Columbus Gravel Company will install machinery at its gravel pit near Columbus, and construct a short railroad to the plant for the purpose of transporting the material.

The Commissioners Court of Orange county has ordered an election of taxpayers of the Mauriceville Drainage district in that county, to be held May 14, to vote on the proposition of issuing $30,000 of bonds for constructing a system of drainage for that district.

Arrangements are being made for the installation of a water works plant and distributing system at Irene. An artesian well is being bored with a view of developing a water supply.

The taxpayers of Sulphur Springs recently voted favorably on the proposition of issuing $30,000 of bonds for the purpose of obtaining a permanent water supply for the water works system and to install a pumping plant.

The Dulaney Gin Company, Ector, has been organized with a capital stock of $10,000 for the purpose of installing a cotton gin. The incorporators are A. B. Scarborough, J. J. Pritchett, G. M. Haffaker and others.

The San Antonio, Rockport & Mexico Railroad Company has located grounds at Rockport for its proposed car shops, roundhouse and other terminal facilities, the construction of which it will soon begin.

Bonds to the amount of $103,669 have been voted by the taxpayers of the Matagorda County Drainage district No. 4 for the purpose of constructing a drainage system that will reclaim about 40,000 acres of land.

W. H. Leslie will install machine shops at Bishop, at a cost of about $15,000.

Herbert H. Heath and associates will install a broom factory at Douglas, Ariz.

The McNeal Co-operative Canning Company, Douglas, Ariz., recently organized with a capital stock of $50,000, will install a large canning factory at that place.

The Compania Cerveceria de Monterey, Monterey, Mexico, has been organized with a capital stock of $300,000 for the purpose of establishing a brewery. Among the men interested in the proposed enterprise are Dr. Remon Trevino, John Forseck and Garza Lazano.

The Commissioners of Court of Cameron County, Texas, has ordered taxpayers of the San Benito Drainage district to vote May 9 on the proposition of issuing $450,667 of bonds to construct a system of drainage for the district. Ward Carpenter is engineer for the district.

The Pacific Coast

SAN FRANCISCO, CAL., April 16, 1912.

The local machine tool market remains rather slow, though some improvement is noted. The principal inquiry now in the market, and the largest so far this year, is from the Southern Pacific Railroad for the Oakland shops. The list includes a large 60-in. forge lathe, a set of large plate bending rolls, a splitting shear and a number of smaller tools, with electric motors. Bids will be opened in July. Some of the larger general machine shops are coming out with good-sized single tool orders, but most of the current business is in small tools of ordinary type for small shops scattered through the interior. The increasing use of automobiles, traction engines and power pumps is creating a demand for better repair facilities, which has a perceptible effect on the trade.

Little important business is developing in woodworking machinery, but there is considerable figuring, and some revival is expected if the present building activity continues. Numerous inquiries are still coming out for water-works machinery, and orders are being booked for irrigation outfits of all types and sizes. Electric power equipment is fairly active.

The Noble Electric Steel Company, San Francisco, will install two additional furnaces at its plant at Heroult. The company will also be in the market for air drills and an air compressor.

The Northwestern Pacific Railroad has just received its new Putnam driving-wheel lathe. The machine is of the heaviest type, with the most improved labor-saving devices, and is said to be the finest tool of its kind ever installed on the coast.

The Byron Jackson Iron Works has taken the contract for turbine pumps for the Ashbury Heights reservoir, this city, at $4,200.

C. C. Moore & Co., this city, have taken the contract for the installation of a second unit of the South Sierras Power Company's plant at San Bernardino, Cal.

Plans are being prepared for the establishing of municipal water, electric light and power plants in Red Bluff, Cal. The water system is estimated to cost about $85,000 and the lighting system, including generating plant, $146,000. The city will issue bonds.

The Western Malleable Castings Company, Los Angeles, has been incorporated with a capital stock of $100,000 by W. F. Kerr, C. A. Post, H. S. Clewett and J. H. Sims.

It is reported that the Golden State Mining & Milling Company, operating quarries in Imperial County, Cal., will install a marble mill at El Centro, Cal.

The Craig Mining Company, operating near Weaverville, Cal., plans to install an ore mill this summer.

The Horse Mountain Copper Company, operating near Eureka, Cal., is figuring on the immediate installation of a new concentrating plant.

The Ramona Power & Irrigation Company has plans about complete for a power plant to be installed in San Jacinto Valley, near San Diego, Cal.

The Watsonville Water Company, Watsonville, Cal., is figuring on a new pumping plant of about 5,000,000 gal. daily capacity.

The Moore & Scott Iron Works, this city, has a contract for installation of a high-pressure oil-burning outfit on the steamer Eureka of the Pacific Coast Steamship Company.

The town of Suisun, Cal., is considering the installation of an auxiliary pumping plant for the municipal water works.

The H. R. Worthington Company has taken a contract for a water-works pumping outfit for the town of Orange, Cal., at $6,368.

The Otis Elevator Company has the contract for elevator work in the new San Francisco Hospital, amounting to $20,500.

The Babcock & Wilcox Company has a contract for two large boilers for the Los Angeles Gas & Electric Company.

The California Barrel Company, this city, is installing an improved dust-collection system in its small-package department.

Eastern Canada

TORONTO, ONT., April 20, 1912.

The weather has not yet become as springlike as it usually is at this time of year, and the roads are still in a bad state. But there are no other drawbacks to trade. Once the seed is in the ground there will be renewed activity in all business circles, especially in the manufacturing industries, for it will take a large output to supply even new population, not to speak of the farming demands of the whole country. The volume of immigration as well as the average wealth of the heads of families coming in its greater than ever. The reserve buying power of the whole country, especially of the western farmers, a large portion of whose crop is still to be marketed, guarantees a big demand.

Plans are being prepared for the Canadian Northern Railway subway in North Battleford to cost $40,000, and to be made of concrete and steel.

The St. Mary's Machine Company of Ohio will esablish a machine plant at Chatham, Ont., to cost $100,000.

William Preston will put up a plant at Galt, Ont., for the manufacture of lathes and planers and tools. Machinery is yet to be bought.

Plans are prepared for the construction in London, Ont., of a factory of the Battle Creek Breakfast Food Company to cost $25,000.

D. S. Perrin & Co., London, Ont., are preparing to put up a new biscuit factory there, to cost $250,000.

The by-law to grant concessions to the Union Furnace Company, Buffalo, has been approved by the ratepayers of Port Colborne, Ont., the works of the company to cost $1,000,000.

The Saddlery & Steel Goods Company, Walkerton, Ont., contemplates an enlargement of factory capacity.

The Canadian General Electric Company, Peterborough, Ont., is building an office and warehouse in Montreal for its own use and that of the Canada Foundry Company, Toronto.

A mill is to be built and equipped with new machinery at Blythe, Ont., for the Blythe Flax Mil Company.

J. C. Furber will establish a factory in Guelph, Ont., for the manufacture of metal weather stripping, screens and ventilating appliances.

The American Radiator Company's factory in Brantford, Ont., is to cost $140,000.

Findlay Bros., Carleton Place, Ont., are erecting a stove foundry there.

The Interlake Paper Company has begun the construction of its plant at Merritton, Ont.

The Dominion Steel Corporation is building a warehouse on the Lachine Canal, Montreal.

The Canadian Linen Fibre Company, head office to be in Toronto, has been incorporated under Dominion letters patent, with a capital stock of $3,000,000.

The St. Maurice Valley Cotton Mills, Ltd., headquarters, Montreal, has been incorporated under Dominion letters patent, with a capital stock of $1,250,000.

The General Motors Company of Canada, head office, Walkerville, Ont., has been incorporated, with a capital stock of $10,000.

The Dominion Steel Castings Company, Toronto, has been incorporated under Dominion letters patent, with a capital stock of $300,000.

The Dayton Airless Tire Company, Montreal, has been incorporated under Dominion letters patent, with a capital stock of $150,000, the principal place of business to be in Montreal.

Wire Goods Lt., is the name of a company that has received Dominion incorporation to do business, principally from Howick, Que., with a capital stock of $50,000.

J. & J. Taylor, Ltd., Toronto, has been incorporated, with a capital stock of $1,000,000., to manufacture safes, etc.

The Cantelo Electric Company, Montreal, has been incorporated, with a capital stock of $50,000.

The Canadian Autobus Company, Montreal, has been incorporated, with a capital stock of $10,000,000. It will manufacture motors and engines of various kinds.

The ratepayers of Midland, Ont., have approved a by-law to make a municipal load of $25,000 to Benson & Bray, to aid in establishing a planing industry.

The American Locomotive Company is enlarging its works at Montreal.

A company with which persons said to be formerly identified with the Canadian Locomotive Company at Kingston are connected, is building a plant in Ham-

ilton, Ont., for the manufacture of steel castings used by locomotive builders.

The Gurney Foundry Company plant at Weston, Ont., is about to be enlarged.

The work of constructing the power works at Waiwaiten Falls in Parenpine District, which was suspended for some months, is now being proceeded with by A. E. Walberg & Co.

The City Council of Niagara Falls, Ont., has obtained the permission of the Provincial authorities to proceed with the construction of a new power house and pumping station.

The Welland Machine & Foundries, Ltd., Welland, Ont., is having plans prepared for a new foundry to replace one of its buildings, which will be equipped with an overhead electric traveling crane. A warehouse and machine shop to manufacture gasoline engines will also probably be built.

The Canadian Fuel-Savers Company, Ltd., Berlin, Ont., has been incorporated with a capital stock of $40,000 by Dilman S. Bowman, Beniah Bowman and Myron Bowman, and will engage in the manufacture of furnaces.

The Jackson Car Company of Ontario, Ltd., Toronto, with $40,000 capital stock, is arranging for the establishing and equipment of a plant for the manufacture of automobiles, autotrucks, etc. The provisional directors are Albert E. Wilson, James P. MacGregor and M. J. Martin.

Western Canada

WINNIPEG, MAN., April 18, 1912.

Industrial and commercial men are pleased with the outlook, and as the season advances activity on spring construction work becomes more in evidence. It is only two weeks since the aggregate of the Winnipeg building permits was reported at $3,000,000, and now the $4,000,000 mark has been passed. A tremendous amount of building is contemplated for this year.

Plans have been completed by H. C. Strange of Bassano, Alta., for the organization of a company to manufacture windows, sash and doors, and certain kinds of furniture.

It is said that the Vulcan Corporation, Phoenix, Ariz., is backing a proposition to establish an automobile factory at Wetaskiwin, Alta.

It is announced that William Davies & Co., meat packers, Toronto, will erect a plant in Winnipeg, for which a site has already been purchased.

The Hudson's Bay Company has announced that large department stores will be erected by it in Vancouver, B. C., and Yorkton, Sask., in addition to the one reported last week for Calgary, Alta. They will all be very large buildings, and it is said that the total sum involved is about $2,325,000.

The grain elevator of The Ogilvie Flour Mills Company, Ltd., at Morden, Man., which was burned recently, will be rebuilt. The western head office of the company is in Winnipeg.

Tenders are called until May 15 for extension to the water and light plant at North Battleford, Sask., to cost about $17,000. The engineers are Chipman & Power, Mail Building, Toronto, and the superintendent, M. D. Caldwell, North Battleford.

A by-law has been passed by the ratepayers of Wetaskiwin, Alta., for $23,000, to extend the electric light plant there.

The Dominion Safe Works, Ltd., Vancouver, B. C., is the name of a company that has been incorporated with a capital stock of $200,000, and will manufacture safes.

Craig & Rose, Edinburg, Scotland, propose to establish branch works for the manufacture of paint in Calgary, Alta.

It is announced that the Winona Pioneer Tractor Company will build a Canadian branch plant at Calgary, Alta., to cost $250,000.

Government Purchases

WASHINGTON, D. C., April 22, 1912.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids May 7, under schedule 4774, for one electrically driven winch.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids for supplies for the navy yards as follows: May 14, schedule 4499, one centrifugal air compressor set, one pipe expanding and flanging machine, one 6-roll double-cylinder planer and matcher machine; May 21, schedule 4505, for one cut-off saw machine.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids April 9 under schedule 4407, class 31, for furnishing and installing one deep well motor-driven pumping outfit at Arlington, Va., as follows:

Bidder 39, Ralph B. Carter Company, New York, $798; 101, National Electrical Supply Company, Washington, D. C., $376; 107, Newport Contracting & Engineering Company, Newport News, Va., $1,291; 125, Rider-Ericsson Engine Company, New York, $640.

The Commissioners of the District of Columbia, Washington, opened bids April 10 for furnishing one D. C. electric generator, 125 kw., direct connected to horizontal steam turbine as follows:

De Laval Steam Turbine Company, Trenton, N. J., $3,800 and $4,854; Kerr Turbine Company, Wellsville, N. Y., $4,151; Carey Machine & Supply Company, Baltimore, Md., $4,250; Fort Wayne Electric Works of the General Electric Company, Philadelphia, Pa., $4,250; Westinghouse Electric & Mfg. Company, Washington, D. C., $4,790, $3,740, $5,256 and $4,640.

The Secretary of the Department of Agriculture, Washington, opened bids April 5 for furnishing one turbo generator set as follows:

Crocker-Wheeler Company, Ampere, N. J., $6,140; General Electric Company, Schenectady, N. Y., $6,500 and $4,350; Kerr Turbine Company, Wellsville, N. Y., $4,895; De Laval Steam Turbine Company, Trenton, N. J., $5,650.

The United States Reclamation Service, Los Angeles, Cal., opened bids March 28 for induction motors for the Boise project. Various alternate bids specifying the time and place of delivery and weight of equipment were received, but bids for the completed work as specified under item 4 are given as follows:

Westinghouse Electric & Mfg. Company, Los Angeles, Cal., $5,250; Crocker-Wheeler Company, Los Angeles, Cal., $5,460; Wagner Electric Mfg. Company, San Francisco, Cal., $6,700; Allis-Chalmers Company, Los Angeles, Cal., $5,500; General Electric Company, Los Angeles, Cal., $5,720; Western Electric Company, Los Angeles, Cal., $3,373. 35.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET

EMPLOYER'S LIABILITY FOR EMPLOYEE'S ASSAULT.—An employer is not responsible for an assault committed by his employees while aiding a constable in taking possession of property replevined by the employer. (Kansas City Court of Appeals, Healy vs. Wrought Iron Range Company, 143 Southwestern Reporter 549.)

NECESSITY FOR GUARDING MACHINERY.—The provision of the New York labor law which requires machinery of every description to be guarded imposes on an employer sued for injury to a workman at an unguarded machine the burden of showing that a guard was impracticable, in order to defeat liability for injury. (New York Court of Appeals, Scott vs. International Paper Company, 97 Northeastern Reporter 413.)

LIABILITY FOR NEGLIGENCE OF TRUCKING COMPANY'S DRIVER.—A manufacturer who engages a teaming company to deliver articles is not liable for personal injury caused by the company's driver in unloading articles. (United States District Court, District of Massachusetts, Ballatty vs. Barrett Mfg. Company, 192 Federal Reporter 229.)

EFFECT OF MICHIGAN LABOR LAW GOVERNING MINORS.—The Michigan law, which prohibits the employment of boys under 18 years old in occupations dangerous to their lives and limbs, does not make a factory inspector's decision conclusive as to whether a particular occupation is dangerous. The fact that a boy lost part of his hand in his employment is not legal evidence that the employment was dangerous. (Michigan Supreme Court, Tabinski vs. A. Harvey's Sons Mfg. Company, 134 Northwestern Reporter 653.)

RESPONSIBILITY FOR FELLOW EMPLOYEE'S NEGLIGENCE.—Under the laws of Alabama, a laborer engaged about a furnace in dumping slag assumed the risk of negligence of fellow employees in leaving water in a pot in which molten slag was poured, resulting in an explosion. (Alabama Supreme Court, Woody vs. Republic Iron & Steel Company, 57 Southern Reporter 441.)

RESPONSIBILITY FOR INJURY CAUSED BY UNGUARDED MACHINERY.—Under the legal rule prevailing in California, an employer is not liable for injury sustained by a workman through the former's negligent failure to guard dangerous machinery or to warn the workman against the danger arising from the absence of a guard if the danger was obvious. (California Supreme Court, Bresette vs. E. B. & A. L. Stone Company, 121 Pacific Reporter 312.)